KU LEUVEN

FACULTEIT PSYCHOLOGIE EN
PEDAGOGISCHE WETENSCHAPPEN

CENTRUM VOOR LEERPSYCHOLOGIE EN
EXPERIMENTELE PSYCHOPATHOLOGIE

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Proefschrift aangeboden tot het verkrijgen van de graad van Doctor in de Psychologie

Specificity and Vantage Perspective of Autobiographical Memories in Borderline Pathology

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Promotor: Prof. dr. Filip Raes
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Specificity and vantage perspective of autobiographical memories in borderline pathology

Kris Van den Broeck
Prof. dr. Filip Raes (supervisor); **Prof. dr. Laurence Claes**, **Prof. dr. Guido Pieters** (co-supervisors)

Autobiographical memory (AM), "the aspect of memory that is concerned with the recollection of personally experienced past events" (Williams et al., 2007, p. 122), is believed to play an important role in the construction and maintenance of one's self-concept. Compared to controls, patients with major depressive disorder (MDD) and post-traumatic stress disorder (PTSD) have repeatedly found to show reduced memory specificity ('overgeneral memory', OGM). This is generally measured with a word cueing task, inviting participants to recall specific memories in response to cues, such as *happy*, or *lazy*. The aforementioned patients tend to retrieve categories of events, rather than memories that refer to a single episode. Furthermore, these patients tend to more often adopt a third-person (observer) perspective during voluntary recall. It has been suggested that OGM and observer memories dampen the emotional arousal evoked by painful memories, thereby preventing one's self-concept to destabilise. However, in the longer term, in has been shown that both strategies increase one's vulnerability for future complaints. Also, both strategies have found to be associated with rumination or comparison-driven processes, and OGM is found to correlate with reduced executive functioning.

Borderline personality disorder (BPD) is a common mental illness with high clinical burden. Although BPD patients often have co-morbid PTSD and MDD, findings on OGM are not fully replicated in these patients. The **first aim** of this thesis, therefore, was to get a clearer view on the associations between OGM and (co-morbid MDD and PTSD in) BPD. The **second aim** was to broaden the current knowledge on vantage point during recall, which, to our knowledge, has never been studied in BPD patients. Recent findings suggest that cues that are highly discrepant towards one's current self-concept increase the likelihood of retrieving OGMs. The **third aim** was to further investigate the association between self-discrepancy on the one hand, and OGM and vantage point during recall on the other hand, both in relation to BPD (features).

After briefly situating our research aims (**Chapter 1**), we present an overview of the literature on OGM in BPD patients (**Chapter 2**). Our findings suggest that both depressed and traumatic state in BPD patients are unrelated to OGM (**Chapters 3 and 4**). Yet, OGM in BPD is predictive for depression symptom severity and trauma symptom severity at six-month follow-up (**Chapter 6**), and we found a negative correlation between OGM and the variety of non-suicidal self-injurious methods used (**Chapter 7**). Therefore, we suggest that BPD patients, as depressed and traumatised patients, may benefit from therapeutic strategies aimed at increasing memory specificity. With respect to vantage perspective, we found that (a) depressed state in BPD is unrelated to the proportion of observer memories retrieved; and (b) that BPD patients with PTSD more often adopt an observer perspective, also when retrieving non-traumatic memories (observer memory retrieval style; **Chapter 4**). In a non-clinical sample, we found that higher levels of observer memories (following high discrepant cues) were associated with more interpersonal and anxious-neurotic BPD complaints (**Chapter 5**). Finally, we developed two methods to study the impact of self-discrepancy on the AM characteristics of interest. Using novel indices, we found that self-discrepancy was negatively associated with memory specificity in depressed BPD patients (**Chapter 3**). However, using self-discrepant cues, we failed to replicate these findings. Also, prompting self-discrepancy had no effect on the vantage point used during recall (**Chapter 4**).

We conclude that the current theories on AM organisation seem to apply insufficiently to BPD. We consider how the patterns observed in BPD patients with respect to OGM and vantage point during recall may be explained by emotional dysregulation and identity disturbance, both characteristic for BPD, and we reflect on the validity of the methods used to investigate the role of self-discrepancy. Finally, clinical implications and directions for future research are discussed (**Chapter 8**).

De specificiteit en het perspectief van autobiografische herinneringen in relatie tot borderline-klachten

Kris Van den Broeck
Prof. dr. Filip Raes (promotor); **Prof. dr. Laurence Claes**, **Prof. dr. Guido Pieters** (co-promotoren)

Het autobiografisch geheugen (AG) beheert de herinneringen aan persoonlijke ervaringen. Vermoedelijk steunen we in belangrijke mate op het AG om ons zelfconcept te ontwikkelen en te handhaven. Patiënten met een majeure depressieve stoornis (MDS) of een post-traumatische stressstoornis (PTSS) kunnen minder goed specifieke herinneringen, verwijzend naar eenmalige gebeurtenissen, ophalen. Ze hebben een overalgemeen (autobiografisch) geheugen (OAG), en verwijzen vaker naar categorieën van gebeurtenissen. Meestal wordt geheugenspecificiteit gemeten door respondenten cues aan te bieden, zoals *gelukkig* of *lui*, waarna ze specifieke herinneringen moeten ophalen. In vergelijking met gezonde proefpersonen, 'zien' depressieve en getraumatiseerde patiënten hun herinneringen ook vaker vanuit een derde-persoonsperspectief (of observatorperspectief). Mogelijk leiden OAG en een meer afstandelijk observatorperspectief ertoe dat pijnlijke herinneringen minder intense emoties heractiveren. Zo wordt verhinderd dat iemands zelfconcept gedestabiliseerd raakt. Echter, op langere termijn, resulteren beide strategieën in meer klachten. OAG hangt verder samen met rumineren en verminderde executieve functies, terwijl het aandeel observatorherinneringen stijgt wanneer men zichzelf evalueert.

De borderline persoonlijkheidsstoornis (BPS) is een veelvoorkomende en ernstige psychische stoornis. BPS-patiënten hebben vaak PTSS en MDS, maar de bevindingen aangaande OAG worden niet altijd gerepliceerd in deze groep. Het **eerste doel** van dit proefschrift was dan ook een beter zicht te krijgen op de samenhang tussen OAG en BPS (en co-morbide MDS en PTSS). Het vergroten van de kennis betreffende perspectiefname tijdens het herinneren was ons **tweede doel**. Voor zover wij weten, is dit nooit onderzocht bij BPS-patiënten. Volgens recente bevindingen ontlokken cues die discrepant zijn ten aanzien van iemands actuele zelfconcept makkelijker categorische herinneringen. Als **derde doel** wilden we dan ook de relatie tussen zelf-discrepantie enerzijds en OAG en perspectiefname bij herinneringen anderzijds verder onderzoeken, steeds in relatie tot BPS(-klachten).

Eerst situeren we onze onderzoeksvragen (**Hoofdstuk 1**). Daarna bespreken we alle beschikbare studies over OAG bij BPS-patiënten (**Hoofdstuk 2**). In onze patiëntensteekproeven waren depressie noch trauma gerelateerd aan OAG (**Hoofdstukken 3 en 4**). Anderzijds voorspelt OAG bij BPS-patiënten de ernst van depressie en trauma na zes maanden (**Hoofdstuk 6**), en is OAG negatief geassocieerd met het gebruik van meer diverse zelf-verwondende methoden (**Hoofdstuk 7**). BPS-patiënten hebben daarom wellicht baat bij therapeutische strategieën die erop gericht zijn om iemands geheugenspecificiteit te vergroten, net als patiënten met MDS en PTSS. Inzake perspectiefname vonden we dat (a) MDS bij BPS-patiënten ongerelateerd is aan de proportie observatorherinneringen die worden opgehaald; en (b) dat BPS-patiënten met PTSS vaker gebruik maken van een observatorperspectief, ook bij het ophalen van niet-traumatische herinneringen (observatorstijl; **Hoofdstuk 4**). In een niet-klinische steekproef was het aantal observatorherinneringen (na hoog-discrepante cues) geassocieerd met meer interpersoonlijke en angstig-neurotische borderline-klachten (**Hoofdstuk 5**). Als we zelf-discrepantie onderzochten aan de hand van indices, vonden we een inverse relatie tussen de mate waarin de cues zelf-discrepant waren en geheugenspecificiteit bij depressieve BPS-patiënten (**Hoofdstuk 3**). Dit werd niet gerepliceerd als we zelf-discrepante woorden gebruiken. Perspectiefname en zelf-discrepantie waren evenmin geassocieerd (**Hoofdstuk 4**).

We concluderen dat de gangbare theorieën over de organisatie van het AG niet eenduidig toepasbaar zijn op BPS-patiënten, en reflecteren over de validiteit van de methoden die we gebruikten om zelf-discrepantie te onderzoeken. Emotionele disregulatie en een gestoorde identiteitsontwikkeling, beide typisch voor BPS, kunnen de geobserveerde patronen met betrekking tot OAG en perspectiefname bij BPS-patiënten mogelijk (mede) verklaren. Tenslotte bespreken we de klinische implicaties van onze bevindingen en mogelijk toekomstig onderzoek (**Hoofdstuk 8**).

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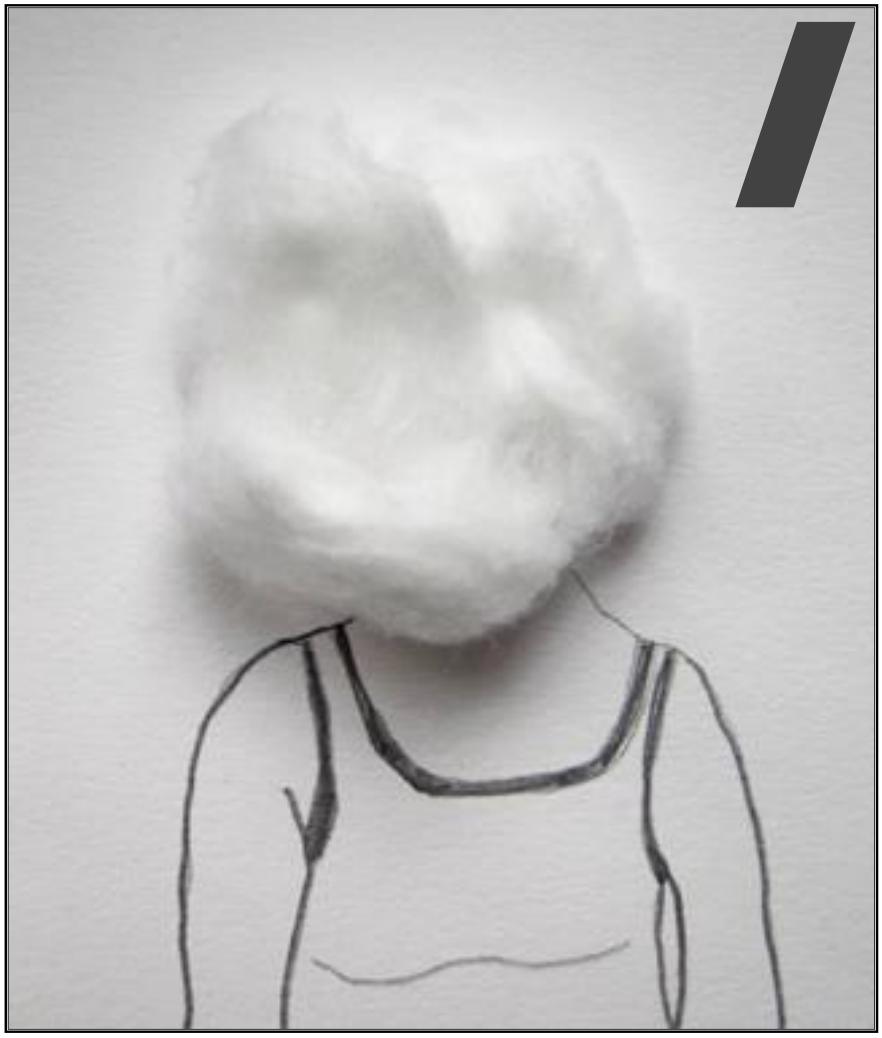

1

General Introduction

INTRODUCTION OUTLINE

This first chapter aims to situate our research topics. Therefore, we will first briefly[1] define the concepts that are central to our research. Subsequently, we will present our hypotheses, and describe how we investigated them. Finally, we will outline the structure of this thesis.

CENTRAL CONCEPTS

AUTOBIOGRAPHICAL MEMORY

Autobiographical memory is that part of memory that is concerned with the management of personally experienced past events. It involves the processing of experiences, and the storage and retrieval of memories. Autobiographical memories are believed to play an important role in the construction, maintenance and evolution of one's self-concept (Conway, 2005; Conway, Singer, & Tagini, 2004; Prebble, Addis, & Tippett, 2013). In addition, autobiographical memory is thought to facilitate daily functioning, because it supports the creation of scripts (Tomkins, 1979), and contributes to successful social problem solving (Evans, Williams, O'Loughlin, & Howells, 1992; Goddard, Dritschel, & Burton, 1992). Given the presumed importance of autobiographical memory, its functioning and characteristics are examined from diverse psychological angles. In this thesis, we are especially interested in the specificity of voluntary (deliberately retrieved) memories, and in the perspective that is adopted while recalling such events.

[1] Each of the following chapters highlights the concepts relevant for that chapter in more detail. In this introductory section, therefore, we confine ourselves to a brief overview of the central concepts.

For theoretical considerations regarding autobiographical memory, we will often refer to the **Self-Memory System (SMS)**, an influential model on autobiographical memory organisation and functioning, developed by Conway and colleagues (Conway, 2005; Conway & Pleydell-Pearce, 2000; Conway et al., 2004 – see also Figure 1). This model assumes that autobiographical memories are stored in the 'autobiographical knowledge base' (AKB). The AKB is a hierarchical structure of layers, with lower layers containing more event-specific knowledge, and higher-order layers clustering the episodic memories into life time periods (e.g., high school period), and general events (e.g., first-time experiences). Specific autobiographical memories are thought to crystallise into semantic knowledge and into one's self-concept, i.e., a consistent set of descriptions ('schemas') about who one actually is and how one actually functions. Additionally, the

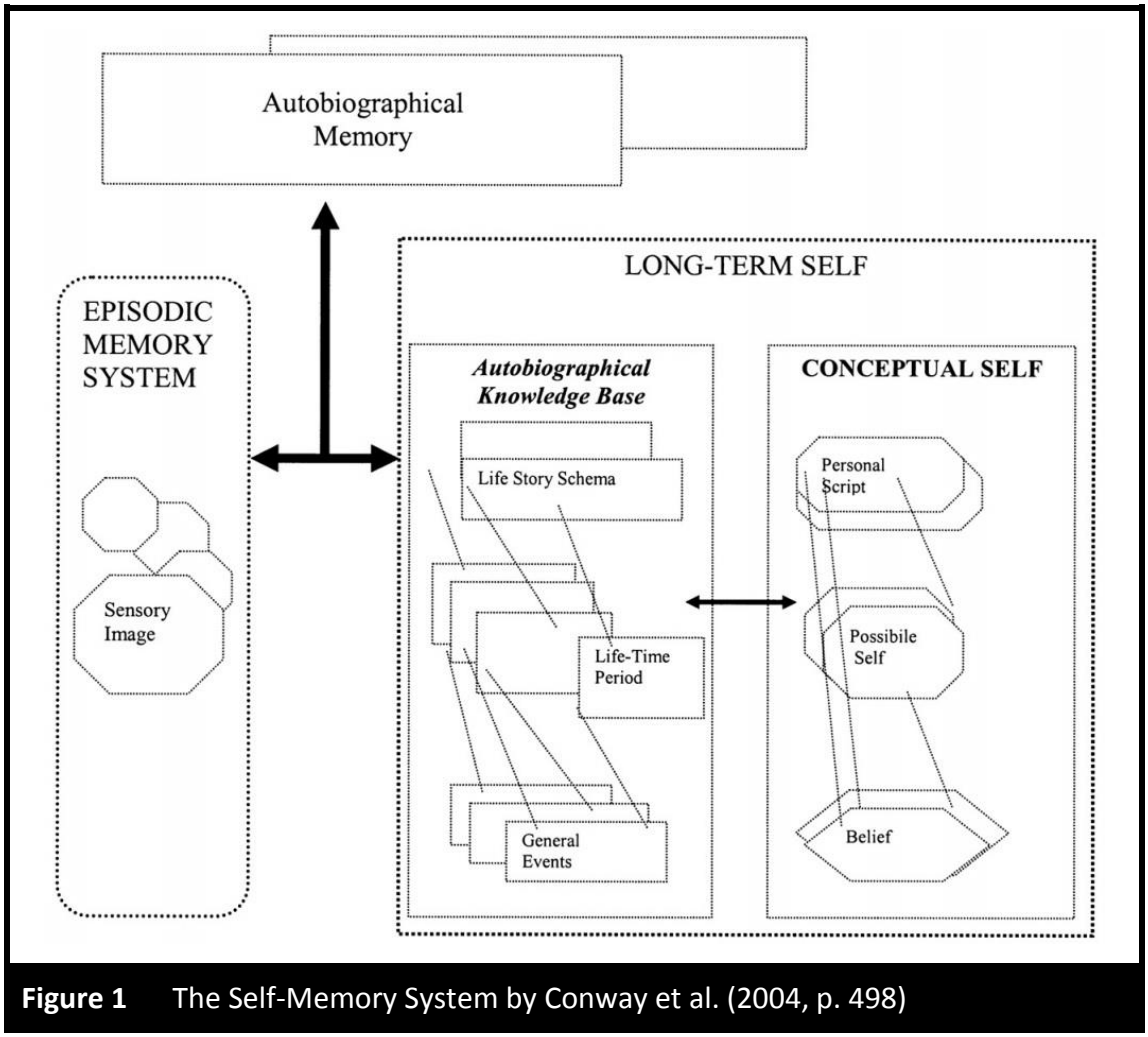

Figure 1 The Self-Memory System by Conway et al. (2004, p. 498)

self-concept also includes personal goals, i.e., ideas about how one ideally would like to be, or about how one thinks one should be according to one's own or others' standards. According to Conway et al. (2004), people use autobiographical memories to consolidate their current self-concept ('**self-coherence**') and to keep track on goal attainment processes ('**adaptive correspondence**'). The 'episodic memory system' (EMS), a structure that precedes the AKB, continuously takes snapshots of our whereabouts, also including all kinds of perceptual features. Most of these snapshots are only available for a short period of time, just long enough to serve adaptive correspondence. For instance, when the goal is to pay your groceries, you should have access to the memory referring to the moment you handed the money to the cashier. However, some episodic memories (e.g., struggling in front of my computer, trying to create a concise text) should be available for a longer period of time, because they serve higher-order goals (e.g., writing a doctoral thesis). These memories get the chance to become integrated in the layers of the AKB, and may become relevant for self-coherence (e.g., they contribute to the belief that, although writing is a difficult process, persistence will result in success). Eventually, gradual changes in one's self-concept may occur.

The processes of self-coherence and adaptive correspondence usually run unconsciously, without one being aware of the relevant memories. However, we are able to retrieve some memories voluntary, e.g., in response to questions as "What did you have for lunch yesterday?", or "Can you remember the last time you were sad?" Such **guided search processes** usually begin with a broader description of the given cues ("What do I usually have for lunch? What did I do yesterday?", or "Sad reminds me of tears, a pillow, my teddy bear…"). These explorations tap into the AKB at the level of general events. By further elaborative and matching processes, the search is refined over and over again. A temporal and goal-sensitive framework gets activated, and the lower layers of the AKB and the episodic clues of the EMS are reached, yielding in a specific, detailed autobiographical memory.

BORDERLINE PERSONALITY DISORDER

Borderline personality disorder (BPD) is a severe mental illness, associated with high mortality rates (e.g., Paris & Zweig-Frank, 2001) and frequent use of mental health resources (e.g., Bender et al., 2001; Zanarini, Frankenburg, Khera, & Bleichmar, 2001). DSM-IV[2] criteria of BPD are listed in Table 1, showing that BPD is characterised by disturbed relatedness, and affective and behavioural dysregulation (Sanislow et al., 2002). Point prevalence is rather high – prevalence rates are estimated at 0.4% to 5.9% in the general population, and about 15% to 25% in residential psychiatric health care (Grant et al., 2008; Gunderson, in Gunderson, 2009; Torgersen, Kringlen, & Cramer, 2001). In addition, co-morbid Axis I and Axis II disorders are very common amongst BPD patients (e.g., Grant et al., 2008; Zanarini, Frankenburg, Hennen, Reich, & Silk, 2004; Zanarini, Frankenburg, Vujanovic, et al., 2004). For instance, one-year prevalence of major depressive disorder (MDD; APA, 1994) and post-traumatic stress disorder (PTSD; APA, 1994) is 19.3%, and 31.6%, respectively (Grant et al., 2008).

Many BPD patients suffer from an unstable sense of self ('identity disturbance'; DSM-IV, APA, 1994) and regularly experience difficulties in problem solving (e.g., Kremers, Spinhoven, van der Does, & van Dyck, 2006b; Maurex et al., 2010). Thus, studying autobiographical memory in BPD patients is particularly relevant, because it may contribute to a better understanding of both BPD and autobiographical memory functioning. We have focussed on two autobiographical memory deficits that have consistently been found in depressed and traumatised patients: reduced memory specificity and the relatively more frequent occurrence of observer memories.

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[2] Because this Ph.D. project started before the publication of the DSM 5, we will consistently refer to DSM-IV (APA, 1994).

Table 1 DSM-IV criteria for borderline personality disorder (BPD; APA, 1994, p. 664)

BPD is manifested by a pervasive pattern of instability of interpersonal relationships, self-image, and affects, and marked impulsivity beginning in early adulthood and present in a variety of contexts, as indicated by five (or more) of the following:

1. Frantic efforts to avoid real or imagined abandonment. Note: Do not include suicidal or self-injuring behaviour covered in (5).
2. A pattern of unstable and intense interpersonal relationships characterised by alternating between extremes of idealisation and devaluation.
3. Identity disturbance: Markedly and persistently unstable self-image or sense of self.
4. Impulsivity in at least two areas that are potentially self-damaging (e.g., substance abuse, binge eating, and reckless driving). Note: Do not include suicidal or self-injuring behaviour covered in (5).
5. Recurrent suicidal behaviour, gestures, or threats, or self-mutilating behaviour.
6. Affective instability due to a marked reactivity of mood (e.g., intense episodic dysphoria, irritability, or anxiety usually lasting a few hours and only rarely more than a few days).
7. Chronic feelings of emptiness.
8. Inappropriate, intense anger or difficulty controlling anger (e.g., frequent displays of temper, constant anger, recurrent physical fights).
9. Transient, stress-related paranoid ideation or severe dissociative symptoms.

MEMORY SPECIFICITY

Following a study of Williams and Broadbent (1986) almost 30 years ago, numerous studies have shown that depressed, remitted depressed, and traumatised patients show reduced memory specificity (RMS), also known as **overgeneral memory** (OGM; for an overview, see Moore & Zoellner, 2007; Williams et al., 2007). Williams and Broadbent (1986) asked their participants to fill out a set of questionnaires and tests, including the **Autobiographical Memory Test** (AMT; Williams & Broadbent, 1986). The AMT consists of a list of cue words, and respondents are instructed to retrieve a **specific memory** (see Table 2 for definition and example) in response to each cue. The

authors discovered that recent suicide attempters, compared to both hospitalised and non-hospitalised controls, retrieved less specific memories. These levels of non-specificity were especially due to higher levels of **categoric memories** (Williams & Dritschel, 1992). OGM was further found to be associated with poor problem solving abilities (e.g., Goddard et al., 1996), higher levels of rumination (e.g., Raes et al., 2005), and an avoidant coping style (e.g., Hermans, Defranc, Raes, Williams, & Eelen, 2005).

Table 2 Possible outcomes on the Autobiographical Memory Task (AMT)

Specific memory	A memory that refers to a single, personally experienced event that did not take longer than one day. E.g., *Lonely – Last Saturday. My partner was out for work, and my friends were not able to come over. I phoned my parents, but could not reach them.*
General memory	
Categoric memory	A memory that refers to a category of events. E.g., *Lonely – Every Wednesday afternoon at work. All my colleagues have outdoor meetings then.*
Extended memory	A memory that refers to an event that took longer than one day. E.g., *Lonely – Those months after we broke up.*
No memory	The answer is not an autobiographical memory, e.g., a semantic associate. E.g., *Lonely – "Only the Lonely" is a classic song from Roy Orbinson.*
Same event	The answer refers to an answer given to a previous cue.
Omission	No answer is given within the time limit.

Early theoretical considerations state that OGM was merely a symptom of MDD and PTSD, perhaps due to reduced executive functioning, inhibiting adequate search processes (Mackinger, Loschin, & Leibetseder, 2000). However, OGM is found in remitted depressed patients as well (e.g., Mackinger, Pachinger, Leibetseder, &

Fartacek, 2000; Park, Goodyer, & Teasdale., 2002), and is predictive for the course of depressive symptoms (for a meta-analysis, see Sumner, Griffith, & Mineka, 2010) and post-traumatic symptoms (e.g., Bryant, Sutherland, & Guthrie, 2007; Kleim & Ehlers, 2008). These findings suggest that OGM is a trait, and that one's position on this trait indicates one's vulnerability for MDD and PTSD. Therefore, relevant theoretical models, such as the SMS (Conway, 2005; Conway et al., 2004), and the **CaR-FA-X model** (Williams et al., 2007) attempt to explain the persistence of OGM apart from the presence of acute depressive and trauma symptoms.

Both frameworks describe the concept of **functional avoidance (FA)**, conceptualising OGM as a generalised avoidant coping strategy. Imagine a driving instructor who causes a car accident. This event probably does not fit his personal goals (e.g., 'I would never want to be involved in a car accident'). Being less specific during the retrieval of such a painful (traumatic, highly self-discrepant) memory may be beneficial in the short term, because it prevents the activation of the associated negative emotions, and, therefore, the destabilisation of one's self-concept (which could lead to depressed feelings). Yet, in the longer term, and when generalised towards other memories as well, OGM is believed to hinder adequate processing of self-discrepant/traumatic information (e.g., Ehlers & Clark, 2000; Foa & Hearst-Ikeda, 1996), resulting in the maintenance of depressive and post-traumatic symptoms. The CaR-FA-X model identifies two additional mechanisms that alone or in combination with FA may be responsible for OGM and associated complaints: **capture and rumination (CaR)**, and **impaired executive resources (X)**. Executive resources are necessary to adequately fulfil a search process, but have been shown to be impaired in depressed (e.g., Hertel & Hardin, 1990) and traumatised patients (e.g., Moradi, Taghavi, Neshat-Doost, Yule, & Dalgleish, 2000). CaR then, refers to problems that may arise during the first orienting stages of a search process. Ruminators or people who have highly elaborated networks concerning the self may get entangled ('captured') in their thoughts and self-descriptions, which then impedes a more thorough search for specific memories.

Although BPD patients often have co-morbid PTSD and MDD (Grant et al., 2008), OGM in BPD patients is only inconsistently found (see Chapter 2 for a review). The **first aim** of this thesis was to gain more insight into the association between OGM and (a co-morbid diagnosis of MDD and/or PTSD in) BPD.

VANTAGE POINT DURING RECALL

Another line of research demonstrated that depressed (e.g., Kuyken & Moulds, 2009), remitted depressed (e.g., Bergouignan et al., 2008) and traumatised patients (e.g., Berntsen, Willert, & Rubin, 2003), compared to controls, also more often retrieve memories while using an observer perspective, as set against a field perspective. Although people can be forced to view their memories from one perspective or the other (Berntsen & Rubin, 2006; Holmes, Coughtrey, & Connor, 2008; Libby, Eibach, & Gilovich, 2005; Nigro & Neisser, 1983), most (recent) recollections are spontaneously remembered from one's original point of view, as if one again 'sees' the situation through one's own eyes ('**first person perspective**', or '**field perspective**'; Berntsen & Rubin, 2006; Nigro & Neisser, 1983; Robinson & Swanson, 1993). When recalling other memories, one might remember the situation as an observer might see it, seeing oneself act in the situation ('**observer perspective**', '**third person perspective**', or 'fly on the wall perspective'). The first kind of memories are generally experienced as more emotional and detailed, whereas in observer mode one is more likely to focus on the objective circumstances than on the affective elements (e.g., Berntsen & Rubin, 2006; McIsaac & Eich, 2002; 2004; Nigro & Neisser, 1983; Robinson & Swanson, 1993; Sekiguchi & Nonaka, 2014).

Why do depressed and traumatised patients recall greater proportions of observer memories? First, similar to OGM, it has been suggested that observer memories could serve **functional avoidance (FA)**. Indeed, the use of an observer perspective is found to be positively associated with avoidant coping strategies (Kenny & Bryant, 2007; Kuyken & Moulds, 2009; Lemogne et al., 2009; McIsaac & Eich, 2004; Williams & Moulds, 2007),

and, as mentioned above, observer memories generally evoke less emotional arousal. Second, observer memories are found to become more likely when one evaluates oneself, or when one needs to **compare** one's actual self with a former or future self (Kuyken & Moulds, 2009; Libby & Eibach, 2002; Libby, Eibach, & Gilovich, 2005). Remember the driving instructor who caused an accident. Such an abrupt distressing event may threaten to disorganise one's self-concept. Focussing on the consistencies between one's current self and former selves, may add to self-coherence. Third, Libby and Eibach (2011) argue that the perspective one adopts during retrieval is rather motivated by how one conceptualises the retrieved life event in relation to the **facets of one's self**. The adoption of a field perspective is assumed to address the experiential self, because this perspective evokes concrete features of a situation. Observer memories on the other hand, would lead people to frame that event in a broader context, e.g., one's self-beliefs, or in relation to other significant events. According to this theory, and opposed to the concept of perspective taking as a FA strategy, observer memories may even intensify emotional responses.

An overarching theoretical framework about the functions of and mechanisms behind vantage perspective during autobiographical recall is missing. However, parallels with OGM seem obvious. The **second aim** of this thesis was to broaden the current knowledge on vantage perspective during memory retrieval. To our knowledge, vantage perspective has never been studied in BPD patients. We therefore aimed to shed some light on the occurrence and relations of observer memories in BPD patients.

SELF-DISCREPANCY

As described above, FA is especially relevant when the retrieval of memories highlights the discrepancies between one's current self and one's personal goals. This implies that the likelihood of retrieving OGMs differs from one person to another and depends on the AMT cues that are used. Indeed, some support has been found that the meaning of a cue at least in part determines memory specificity in (remitted) depressed (e.g.,

Barnhofer, Crane, Spinhoven, & Williams, 2007; Crane, Barnhofer, & Williams, 2007; Spinhoven, Bockting, Kremers, Schene, & Williams, 2007) and borderline patients (Spinhoven et al., 2007, study 2). As far as we know, the association between vantage point during retrieval and self-discrepancy has never been examined before. However, if vantage point serves FA, it would be reasonable to expect higher proportions of observer memories when respondents are asked to retrieve self-discrepant memories.

The **third aim** of this thesis was to further investigate the association between self-discrepancy and memory specificity, and to explore the association between self-discrepancy and vantage point during recall.

HYPOTHESES

The theoretical and clinical relevance of autobiographical memory and the clinical burden of MDD, PTSD, and BPD justify a thorough study of autobiographical memory characteristics in these patients. The general aim of this thesis was to clarify the associations between OGM and vantage point during recall on the one hand, and (a co-morbid diagnosis of MDD and PTSD in) BPD on the other hand. Following a critical analysis of all relevant studies (with respect to OGM, see Chapter 2), we formulated six hypotheses:

1. ***AUTOBIOGRAPHICAL MEMORY DISTURBANCES (IN BPD, BUT NOT EXCLUSIVELY) DEPEND ON THE AMT CUES USED.***

   Usually, the AMT consists of a standard set of cues. Personal connotations respondents make in response to cues are neglected this way. However, it is only reasonable to assume that different cues evoke different memories in different people.

2. ***AUTOBIOGRAPHICAL MEMORY DISTURBANCES IN BPD ARE ASSOCIATED WITH A CO-MORBID DEPRESSED STATE AND/OR DEPRESSION SYMPTOM SEVERITY***

   Despite the strong associations between OGM and MDD, current and previous depressed states have not been systematically assessed in studies questioning OGM in BPD. If depressed state was administered, inconsistent outcomes have been found. We thus cannot exclude that autobiographical memory disturbances may be solely associated to (previous) depressed state(s). Furthermore, given previous findings in non-BPD patients suggesting that (remitted) depressed patients report higher proportions of observer memories, we hypothesised that vantage perspective during recall may be mainly associated with depressed state in BPD patients as well.

3. ***AUTOBIOGRAPHICAL MEMORY DISTURBANCES IN BPD ARE ASSOCIATED WITH A CO-MORBID DIAGNOSIS OF PTSD AND/OR TRAUMA SYMPTOM SEVERITY.***

   Likewise, despite the association between OGM and trauma symptoms and a co-morbid diagnosis of PTSD (Moore & Zoellner, 2007), and although many BPD patients have been exposed to trauma, the association between the presence of PTSD or trauma symptoms and autobiographical memory disturbances in BPD has only gained little attention. Indeed, autobiographical memory disturbances in BPD may be mainly associated with PTSD/ trauma symptoms.

4. ***AUTOBIOGRAPHICAL MEMORY DISTURBANCES IN BPD ARE ASSOCIATED WITH PHENOTYPICAL BPD FEATURES.***

   Because the diagnosis of BPD has many different phenotypes, autobiographical memory disturbances in BPD may be associated with one or more DSM criteria (APA, 1994) or BPD symptoms in particular. To our knowledge, this has never been tested before with respect to OGM. However, it might explain why previous findings on OGM in BPD have been mixed. Vantage perspective during autobiographical memory retrieval has never been studied in BPD patients at all.

5. ***AUTOBIOGRAPHICAL MEMORY DISTURBANCES IN BPD ARE RELATED TO A LESS FAVOURABLE OUTCOME ON BPD SYMPTOMS, DEPRESSIVE SYMPTOMS, AND/OR TRAUMA SYMPTOMS.***

   According to the functional avoidance hypothesis, the autobiographical memory disturbances of interest predict a diminished reduction of complaints in the longer term, suggesting an increased vulnerability. In non-BPD patients, OGM has indeed been found to predict the course of depression (Sumner et al., 2010) and post-traumatic symptom severity at follow-up (e.g., Bryant et al., 2007; Kleim & Ehlers, 2008). Likewise, the adoption of an observer perspective during the retrieval of traumatic events shortly following trauma is found to predict PTSD status at 12-month follow-up (Kenny et al., 2009). As far as we know, the predictive value of vantage perspective during recall for the course of (MDD or PTSD in) BPD has never been examined. With respect to OGM, Kremers et al. (2006a) found that OGM was not predictive for future complaints in their sample of BPD patients.

6. ***PREVIOUSLY FOUND ASSOCIATIONS BETWEEN AUTOBIOGRAPHICAL MEMORY DISTURBANCES AND OTHER VARIABLES ARE REPLICATED IN BPD PATIENTS***

   OGM in depressed and traumatised patients has been found to be associated with higher levels of rumination (e.g., Raes et al., 2005), cognitive avoidance (e.g., Hermans et al., 2005), and with reduced executive functioning (e.g., Dalgleish et al., 2007). In addition, we hypothesise that OGM in our sample of BPD patients will be associated with socio-demographic variables as age and education (see also Chapter 2), dissociation (Jones et al., 1999), and non-suicidal self-injury (Startup et al., 2001), as was found previously in other BPD samples. Finally, we will explore whether vantage point during recall is associated with these variables in our sample of BPD patients.

METHODS

We have tested these hypotheses in a large sample of patients suffering from personality disorders (N = 74, with 55 diagnosed with BPD; Chapters 4, 6, and 7), in a smaller clinical sample (N = 34, all BPD patients; Chapter 3), and in two non-clinical samples (N = 148 and N = 120; Chapter 5, and 8), using different versions of the AMT to measure memory specificity and vantage perspective during recall. To test Hypothesis 1 (the potential role of self-discrepancy), we developed a method to calculate indices expressing to what extent the standard AMT is discrepant towards one's current self-concept (Chapter 3). We further administered personalised AMTs (Chapter 4), and written 'group-specific' AMTs (non-clinical samples, e.g., Chapter 5). For the personalised AMTs, we used each respondent's most self-discrepant self-guides they provided during the administration of the Self-Description Questionnaire (SDQ; Higgins, Klein, & Strauman, 1985). The 'group-specific' AMTs were constructed using cues that were judged as high or low discrepant by clinicians for patients with MDD or BPD.

To examine whether OGM and observer memories were particularly associated with MDD (severity), PTSD (symptom severity), or BPD (features), we included interviews (e.g., Structured Clinical Interview for DSM-IV Disorders, Axis I and II) and tests (e.g., Assessment of DSM-IV Personality Disorders; Beck Depression Inventory-II; Borderline Syndrome Index; Impact of Event Scale) for proper diagnosis of MDD, PTSD, and BPD, and to assess symptom severity.

To examine Hypothesis 5 (on the predictive value of OGM and observer memories for future depressive, trauma-related, or BPD complaints), we have included a six-month follow-up phase in the large clinical BPD trial, which was completed by 61.11% of the BPD patients.

Finally, in an attempt to replicate previous associations between OGM and other constructs found in depressed and traumatised patients (Hypothesis 6), we administered a large test battery in our large clinical BPD sample assessing, e.g.,

rumination, experiential avoidance, and dissociation. This also allowed us to explore potential associations between observer memories on the one hand, and these constructs on the other hand.

We always used standard data-analytic techniques (multivariate regression, analysis of variance, bootstrapping), and most of our measures had proven reliability and validity.

DISSERTATION OUTLINE

Chapter 2 presents an overview of the literature on OGM in BPD patients, published so far. We formulate some topics that should be taken into account when conducting future research, in order to control for methodological concerns and the complexity of the BPD diagnosis.

In **Chapter 3**, we focus on Hypotheses 1 and 2. More precisely, we studied the impact of self-discrepant information on the specificity of autobiographical memory retrieval. As outlined above, we created indices expressing to what extent the AMT was relevant and discrepant for each respondent. We then examined the association between these indices and memory specificity in depressed and non-depressed BPD patients.

In **Chapter 4**, we focus on Hypotheses 1 to 3. More precisely, in line with Hypothesis 2, we investigated in our large clinical BPD sample whether (current or remitted) depressed BPD patients show more OGM and retrieve more observer memories than never depressed BPD patients. Furthermore, in line with Hypothesis 3, we examined whether BPD patients with a co-morbid diagnosis of PTSD more often adopt an observer perspective during autobiographical memory retrieval, and whether they are less specific than BPD patients without PTSD. Finally, extending our findings of Chapter 3 on the role of the content of the cues (Hypothesis 1), we now used personalised AMTs to prompt self-discrepancy. We examined whether this resulted in more OGM and higher proportions of observer memories than standard AMT administration. Furthermore, we explored whether the impact of self-discrepancy on the specificity and

vantage perspective during autobiographical memory retrieval was associated with depressed or traumatic state.

Chapter 5 then, reports on the findings of the larger non-clinical study, investigating the association between vantage perspective during recall and borderline symptom clusters (Hypothesis 4), and the potential impact of cue-discrepancy on this relationship (Hypothesis 1).

In **Chapter 6**, we turn to Hypothesis 5, testing whether memory specificity added to the prediction of depression symptom severity and trauma symptom severity of BPD patients at six-month follow-up.

Finally, Hypothesis 6 is partially investigated in **Chapter 7**. In fact, we attempted to replicate earlier findings on the (negative) association between OGM and the frequency of non-suicidal self-injury (NSSI) in BPD patients (Startup et al., 2001).

In **Chapter 8**, we summarise our findings with respect to each of our research aims. Considering previous findings, and the strengths and shortcomings of our studies, we then discuss to what extent the current models on autobiographical memory organisation are applicable to BPD patients, and how emotional dysregulation and/or identity disturbance, two characteristics of BPD, could add to an explanation of the observed patterns of findings. Finally, we formulate repercussions for therapy and directions for future research.

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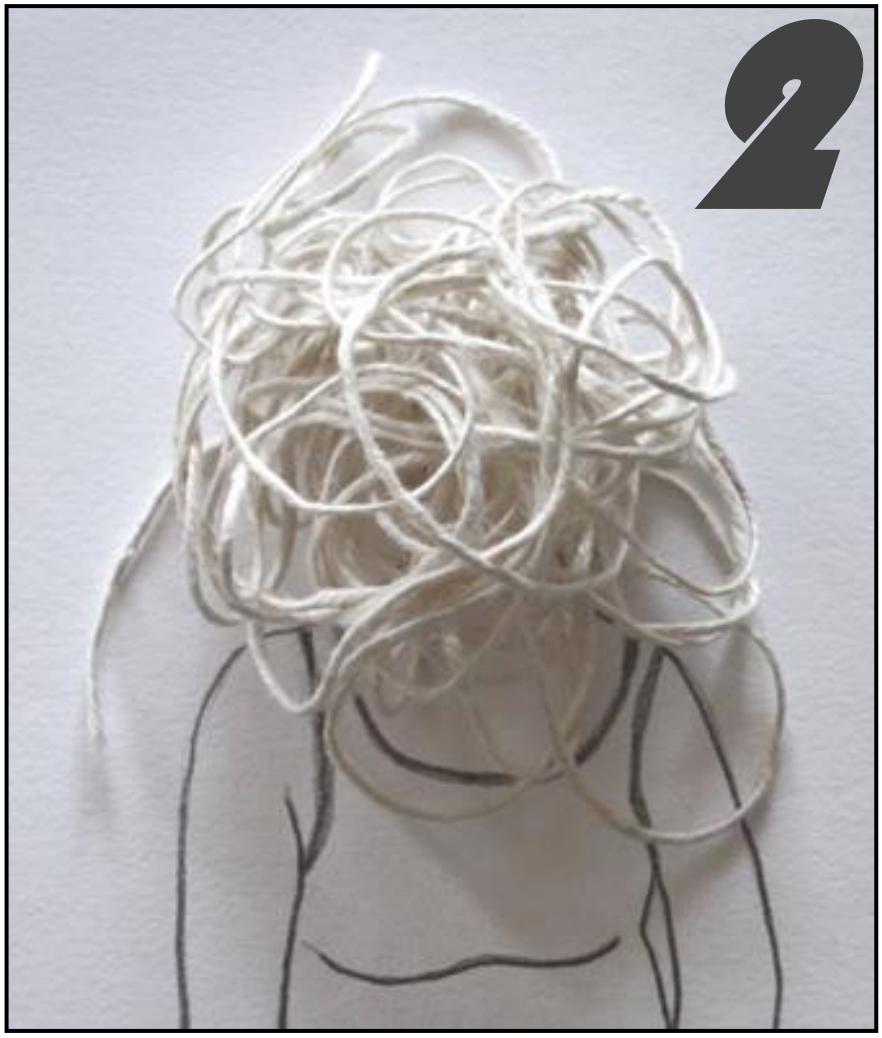

Overgeneral Memory in Borderline Personality Disorder: A Review

Adapted from:

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ABSTRACT

Overgeneral memory (OGM), the tendency to retrieve categories of memories rather than single events, is often observed in (previously) depressed and traumatised patients. This chapter reviews the findings on OGM in relation to borderline personality disorder (BPD). Although depression and trauma are very common in BPD patients, OGM has not been consistently found in this population. Methodological issues however, may impede researchers from unambiguously drawing conclusions about this finding. These limitations are listed. We further investigate to what extent the current findings on OGM in BPD are consistent with the prevailing theoretical models on autobiographical memory organisation. Finally, directions for model fine-tuning and future research are suggested.

INTRODUCTION

First described by Williams and Broadbent (1986), overgeneral memory (OGM) is a robust finding in depressed, previously depressed, and traumatised patients (for an overview, see Moore & Zoellner, 2007; Williams et al., 2007). OGM refers to the difficulties these clinical groups experience in retrieving specific information from their autobiographical memory, typically assessed using the Autobiographical Memory Test (AMT; Williams & Broadbent, 1986). In this task, respondents are asked to recall specific memories in response to cue words (e.g., *anxious*). Instead of recalling, as instructed, detailed information on "personally experienced events that happened only once and did not last longer than one day", the aforementioned patients tend to retrieve categories of events rather than specific recollections (e.g., "Whenever I visit my mother-in-law", rather than "When my mother-in-law turned 60 and invited us over for coffee and cake"). OGM is also associated with poor problem solving abilities (e.g., Goddard, Dritschel, & Burton, 1996), higher levels of rumination (e.g., Raes et al., 2005),

and an avoidant coping style (e.g., Hermans, Defranc, Raes, Williams, & Eelen, 2005; Muenks, 2010).

Initially, OGM was considered as a symptom of emotional disorders, e.g., following the premature abortion of guided search processes (Norman & Bobrow, 1979; Reiser, Black & Abelson, 1985). However, more recent frameworks, such as the Self-Memory System (SMS; Conway, 2005; Conway & Pleydell-Pearce, 2000; Conway, Singer, & Tagini, 2004) and the CaR-FA-X model (Williams et al., 2007) suggest that OGM also may play a more causal role in the onset and/or maintenance of a depressive state or post-traumatic symptoms. According to these models, specific retrieval of painful memories may reactivate related emotions, which may in turn be threatening for the stability of one's self-concept. Therefore, in order to avoid reliving painful memories, patients are thought to have learned, by means of negative reinforcement and generalisation, to stay at a more general level. This is known as functional avoidance (FA). Although FA may prevent emotional turmoil in the short term, it is believed to lead to the enduring existence of traumatic intrusions in the longer term.

The SMS more closely describes the mechanisms that may be underlying FA, suggesting the likelihood of retrieving OGMs may differ from one person to another and depending on the AMT cues that are used. In 2004, Conway et al. defined the Working Self (WS), which has two, potentially conflicting tasks. First, and foremost, the WS should construct and maintain an accurate, integrated and stable sense of self over time ('self-coherence'). It therefore makes information that supports current self-concepts highly available. Second, the WS should monitor progress in goal-directed activities ('adaptive correspondence'). Problems may arise when discrepancies between one's actual condition and one's desired state (goal) are strongly emphasised. A business man who has always dreamt of being successful and rich probably finds it very difficult when he finds himself being dejected due to a missed promotion. In order to prevent destabilisation of one's self-concept (and potentially a full-blown depression), resources are then shifted away from adaptive correspondence to self-coherence. In

case of guided search processes, this action will result in the inability to retrieve event-specific knowledge. The SMS thus suggests that it would be more difficult (or unlikely) to recall specific information in response to cues that tap into domains that are highly discrepant from one's actual self. Data from Crane, Barnhofer, and Williams (2007) support this idea.

The CaR-FA-X model identifies two additional mechanisms that alone or in combination with FA may be responsible for OGM and associated complaints: capture and rumination (CaR), and impaired executive resources (X). Executive resources are necessary to adequately fulfil a search process, but have been shown to be impaired in depressed (e.g., Hertel & Hardin, 1990) and traumatised patients (e.g., Moradi, Taghavi, Neshat-Doost, Yule, & Dalgleish, 2000). CaR then, refers to problems that may arise during the first orienting stages of a search process. Ruminators or people who have highly elaborated networks concerning the self may get entangled ('captured') in their thoughts and self-descriptions, which then impedes a more thorough search for specific memories.

In this chapter we will focus on the findings on OGM in patients suffering from borderline personality disorder (BPD). DSM-IV criteria of BPD are listed in Table 1 (Chapter 1, p. 7), showing that BPD is characterised by disturbed relatedness, affective and behavioural dysregulation (Sanislow et al., 2002). BPD is a severe mental illness, associated with high morbidity (e.g., Paris & Zweig-Frank, 2001) and frequent use of mental health resources (e.g., Bender et al., 2001; Zanarini, Frankenburg, Khera, & Bleichmar, 2001). In addition, co-morbid Axis I (e.g., Grant et al., 2008; Zanarini, Frankenburg, Hennen, Reich, & Silk, 2004) and Axis II (e.g., Grant et al., 2008; Zanarini, Frankenburg, Vujanovic, et al., 2004) disorders are very common amongst BPD patients. General prevalence is rather high – prevalence rates are estimated at 0.4% to 5.9% in the general population, and about 15% to 25% in residential psychiatric health care (Torgersen, Kringlen, & Cramer, 2001; Grant et al., 2008; Gunderson, in Gunderson,

2009) – with no differences between males and females (Leichsenring, Leibing, Kruse, New, & Leweke, 2011).

Patients diagnosed with BPD often have co-morbid post-traumatic stress disorder (PTSD; APA, 1994; up to 31.6% of BPD patients met criteria for PTSD during the last 12 months, according to Grant et al., 2008) and major depressive disorder (MDD; APA, 1994; up to 19.3% of BPD patients met criteria for MDD during the last 12 months), and they report mood-state independent rumination (e.g., Abela, Payne, & Moussaly, 2003; Smith, Grandin, Alloy, & Abramson, 2006) and disturbed executive resources (Maurex, 2009). Furthermore, many BPD patients suffer from an unstable sense of self ('identity disturbance'; DSM-IV, APA, 1994) and regularly experience difficulties in solving problems (e.g., Kremers, Spinhoven, van der Does, & van Dyck, 2006b; Maurex et al., 2010). Therefore, and given the assumed role of OGM as an emotion regulation strategy during psychopathology, we would expect that BPD patients, too, would show problems retrieving specific memories. In any case, it could be useful to investigate OGM in BPD patients, given the current ideas and findings on the role of autobiographical memory in the construction of one's self-concept (e.g., Conway & Pleydell-Pearce, 2000; Jørgensen et al., 2012) and its involvement in problem solving (e.g., Sutherland & Bryant, 2008).

In this chapter we will discuss in detail the findings on OGM in patients with BPD. Additionally, we will investigate to what extent these findings are consistent with the prevailing theoretical models on autobiographical memory organisation described above. Finally, directions for further research will be outlined.

STUDIES ON OGM IN RELATION TO BPD

Reviewing the literature, we found 12 publications describing eight different samples[3] directly examining OGM in relation to BPD. In eight studies, consisting of seven different samples, control groups were included, consisting of either healthy individuals (Jones et al., 1999; Jørgensen et al., 2012; Kremers, Spinhoven, & van der Does, 2004; Kremers et al., 2006b; Maurex et al., 2010; Reid & Startup, 2010; Renneberg, Theobald, Nobs, & Weisbrod, 2005) or clinical populations (Artnz, Meeren, & Wessel, 2002; Jørgensen et al., 2012; Kremers et al., 2004; Renneberg et al., 2005). Some studies also investigated the relationships between OGM and borderline-related symptoms such as dissociation (Jones et al., 1999; Kremers et al., 2004; Kremers, Spinhoven, van der Does, & van Dyck, 2006a; Renneberg et al., 2005), self-harm (Maurex et al., 2010; Renneberg et al., 2005; Startup et al., 2001), problem solving abilities (Kremers et al., 2006b; Maurex et al., 2010), traumatic intrusions (Maurex et al., 2010; Kremers et al., 2004; 2006a), and rumination (Van den Broeck, Claes, Pieters, & Raes, 2012 – see also Chapter 3 in this thesis) in BPD patients.

Table 3 presents an overview of the studies of interest, describing the studied samples and the type of Autobiographical Memory Test (AMT) that was used.

[3] Jones et al. (1999) and Startup et al. (2001) reported on one sample. Also, Kremers et al. (2004; 2006a; 2006b), and Spinhoven, Bockting, Kremers, Schene, and Williams (2007) reported on one sample.

Table 3 Sample and AMT characteristics of the studies on OGM in relation to BPD (symptoms)

			AMT characteristics					
	Participants	Controls	Number and valence of cues	Kind of cues	Cue presentation	Time limit	Scoring system	Variable of interest
Jones et al. (1999)	23 BPD outpatients (5 males)	23 healthy controls, matched for age, gender, and years of education	6+ / 6- / 6°	Nouns and adjectives	Verbally	30s	S / G / O	#G
Startup et al. (2001)	Id Jones et al. (1999)	No control group	6+ / 6- / 6°	Nouns and adjectives	Verbally	30s	S / G / O	#G
Artnz et al. (2002)	9 outpatients with BPD as first diagnosis (3 males)	9 patients with MDD as first diagnosis; 11 patients with primarily an AD; 10 patients suffering primarily from a PD other than BPD	Dutch translation of original AMT of Williams & Broadbent (1986): 5+ / 5-	Adjectives (traits)	Not reported	60s	S / NS	#S
Kremers et al. (2004)	83 BPD outpatients (6 males), of which 47 also suffered from MDD and 24 had PTSD	30 healthy controls (0 males) without childhood sexual or physical abuse nor Axis I pathology; 26 MDD outpatients (no bipolar or psychotic disorder, no substance abuse)	AMT version of McNally, Lasko, Macklin, & Pitman (1995): “a specific moment at witch you exhibited the trait presented”; 5+ / 5-	Adjectives (traits)	Visually + Verbally	60s	S / C / E / No comply or missed / O	%S

Renneberg et al. (2005)	30 BPD inpatients (0 males), of which 19 also suffered from MDD, and 11 had PTSD	30 healthy controls (0 males; BDI < 12; max 1 BPD criterion of SCID), matched for age and years of education to BPD group; 27 MDD inpatients (no Axis II cluster B diagnosis)	5+ / 5- / 5°	Adjectives	Visually	60s	S / C	#S / #C, but also latency to S, valence of memory content, and age of memory
Kremers et al. (2006a)	At T1: Id Kremers et al. (2004); at T3, 55 participants (5 males) remained, of which 37 suffered initially from MDD, and 18 did not.	No control group	AMT version of McNally, Lasko, Macklin, & Pitman (1995); see Kremers et al. (2004); 5+ / 5-	Adjectives (traits)	Visually + Verbally	60s	S / C / E / No comply or missed / O	%S

Kremers et al. (2006b)	78 BPD patients from the Kremers et al. (2004) study, of which 44 also had MDD (3 males), and 34 (3 males) had a history of parasuicidal acts	30 healthy controls from the Kremers et al. (2004) study	AMT version of McNally, Lasko, Macklin, & Pitman (1995); see Kremers et al. (2004); 5+ / 5-	Adjectives (traits)	Visually + Verbally	60s	S / C / E / No comply or missed / O	%S
Spinhoven et al. (2007)	82 BPD patients from the Kremers et al. (2004) study	No control group	AMT version of McNally, Lasko, Macklin, & Pitman (1995); see Kremers et al. (2004); 5+ / 5-	Adjectives (traits)	Visually + Verbally	60s	S / C / E / No comply or missed / O	%S
Maurex et al. (2010)	47 BPD outpatients (0 males), with at least 2 suicide attempts of which at least 1 during the past 6 months	30 healthy controls (no BPD according to SCID, no trauma exposure), matched for educational level with the BPD patients	12+ / 12- / 12°	Adjectives (only?)	Verbally	30s	S / C / E / SA / O	#S / #C / #E / #SA / #O

Reid and Startup (2010)	31 BPD outpatients (7 males), of which 22 also had MDD (5 males), who were all engaged in at least 3 episodes of self-harming behaviour during the last 12 months	29 healthy controls (6 males), matched for age and gender with the BPD patients, and without BPD and MDD	6+ / 6-	Nouns and adjectives	Verbally	60s	S / C / E / O	%S / %C / %E / %O
Jørgensen et al. (2012)	17 BPD inpatients (all female), and without co-morbid OCD diagnosis. 16 of them met the identity disturbance criterion as measured by the SCID.	23 psychology students ('nonclinical controls'; all female); 14 OCD inpatients (7 males), of which 3 had a co-morbid no-BPD Axis II diagnosis as measured by the SCID	No AMT, but a modified version of the Life Story Event Task (Rubin, Berntsen, & Hutson, 2009) was used.					

Van den Broeck et al. (2012)	34 BPD inpatients (7 males), of which 11 were considered currently depressed (4 MDD, 1 Depressive disorder NOS, 8 Adjustment disorder)	No control group	9+ / 9-	Adjectives	Written version	No time limit	S / C / E / NM-SA / SE / O Participant-rated / corrected by researcher	pS / pC

#[C/E/G/O/S/SA] = Number of …; %[C/E/O/S] = percentage of …; +/-/° = positive/negative/neutral valence; AD = Anxiety Disorder; AMT = Autobiographical Memory Test; BDI = Beck Depression Inventory; BPD = Borderline Personality Disorder; C = general categoric memories; E = general extended memories; G = general memories; MDD = Major Depressive Disorder; NM = no memory; NOS = Not Otherwise Specified; NS = non-specific memories; O = omissions; OCD = Obsessive-Compulsive Disorder; p[C/S] = proportion of …; PD = Personality Disorder; PTSD = Post-Traumatic Stress Disorder; S = specific memories; SA = semantic associates; SCID = Structured Clinical Interview for DSM-IV Disorders; SE = Same Event

OGM IN BPD PATIENTS

OGM IN RELATION TO DIAGNOSTIC STATUS, SEVERITY OF PSYCHOPATHOLOGY, AND BPD-RELATED SYMPTOMS

This section consecutively summarises findings on whether or not OGM is associated with (1) diagnostic status of BPD, MDD, PTSD or other anxiety disorders; (2) severity of BPD, depression or anxiety; and (3) symptoms often associated with BPD, such as dissociation, self-harm, deficient problem solving skills, and rumination.

In three studies, BPD patients were found to be more overgeneral (Jones et al., 1999; Maurex et al., 2010) and less specific than healthy controls (Maurex et al., 2010, Reid & Startup, 2010). In other studies, in contrast, BPD patients were found to produce just as many categorical (Reid & Startup, 2010) or specific (Renneberg et al., 2005) memories as healthy and depressed controls. Also, Arntz et al. (2002) found that a diagnosis of BPD was unrelated to the number of specific memories retrieved, r = .004. One study by Jørgensen et al. (2012) found a trend for lower proportions of specific memories in BPD patients as compared to patients with obsessive-compulsive disorder and healthy controls. Thus, when co-morbid disorders during BPD are not controlled for, evidence for OGM in BPD is divided: some data support the hypothesis of OGM being present in BPD patients (Jones et al., 1999; Maurex et al., 2010), whereas others refute it (Arntz et al., 2002; Jørgensen et al., 2012; Renneberg et al., 2005), or are inconclusive (Reid & Startup, 2010).

Arntz et al. (2002) discovered that MDD (and personality disorders other than BPD) rather than BPD, or any form of anxiety disorder, predicted AMT outcome with regard to specificity. The data of Kremers et al. (2004) also suggested that OGM was more related to MDD than to BPD. They found that only the currently depressed BPD patients retrieved less specific memories than controls, as did their control group of MDD patients. When studying the role of cue discrepancy, Spinhoven et al. (2007) and Van den Broeck et al. (2012) found that highly relevant or discrepant cues led to reduced

memory specificity, especially in currently depressed BPD patients. These findings suggest that, in addition to the meaning of the cue, and in line with the results of Arntz et al. (2002) and Kremers et al. (2004), a co-morbid diagnosis of MDD is more important in predicting OGM than the diagnosis of BPD. However, other studies (Maurex et al., 2010; Reid & Startup, 2010; Renneberg et al., 2005) found no differences between (currently/previously) depressed BPD patients and non-(never-)depressed BPD patients in memory specificity, yet Renneberg et al. (2005) found that MDD patients retrieved more categorical memories than BPD patients (with and without MDD). Somewhat surprisingly, Reid and Startup (2010) found that difficulties retrieving specific memories especially emerged in their non-depressed BPD sample.

Memory specificity was also found to be unrelated to a co-morbid diagnosis of PTSD in BPD patients (Kremers et al., 2004; Renneberg et al., 2005). Maurex et al. (2010) found that memory specificity was negatively associated with lifetime exposure to violence[4], however Kremers et al. (2004) were not able to replicate such an association between trauma exposure and OGM in BPD patients. According to Artnz et al. (2002), neither trauma exposure nor the presence of an anxiety disorder is related to reduced memory specificity (in a sample that at least in part consisted of patients suffering from BPD).

With regard to the association between OGM and the severity of psychopathology reported, the data indicate a more coherent picture. Memory specificity seems to be unrelated to BPD severity (Kremers et al., 2006a; Maurex et al., 2010). Also, no relation was found between anxiety severity and OGM in BPD patients (Jones et al., 1999; Maurex et al., 2010). Depression severity was mostly found to be unrelated to reduced memory specificity in BPD patients (Jones et al., 1999; Kremers et al., 2004; 2006a; Maurex et al., 2010; Renneberg et al., 2005), except in the study by Van den Broeck et

[4] This association was not remained after Bonferroni correction.

al. (2012) who observed a negative association between the proportion of specific memories retrieved and scores on the Beck Depression Inventory (BDI-II).

OGM, considered an emotion regulation strategy since the beginning of theorising, has also been studied in relation to other symptoms that have been thought to have similar functions and that regularly occur in BPD patients, e.g., dissociation and parasuicidal acts. In addition, because of the robust associations in depressed samples between OGM on the one hand and problem solving abilities and rumination on the other, analogous relationships were hypothesised in BPD patients, whom are known to have poor problem solving capabilities (e.g., Kremers et al., 2006b; Maurex et al., 2010) and high levels of rumination (e.g., Smith et al., 2006). In general, with regard to these borderline-related symptoms, few associations have been found, and none of them have been replicated by other studies. Jones et al. (1999) found that more dissociation was reported when respondents retrieved more general memories, but memory specificity was not found to be associated with scores on the Dissociative Experiences Scale (DES) in BPD patients (Kremers et al., 2004; 2006a; Renneberg et al., 2005). In the Jones' et al. (1999) BPD sample, Startup et al. (2001) discovered that the more general memories were retrieved, the less parasuicidal acts were reported during the four months prior to testing, however neither Renneberg et al. (2005), nor Maurex et al. (2010) were able to replicate these findings. The latter, however, found that reduced memory specificity was associated with poor problem solving abilities in BPD patients, thereby contradicting earlier findings of Kremers et al. (2006b). These authors found that problem solving abilities did not correlate significantly different with memory specificity in (depressed and non-depressed) BPD patients than in controls. Furthermore, only Van den Broeck et al. (2012) have so far found a negative association between memory specificity and rumination, but the correlation disappeared when depression severity was controlled for. No associations were found between memory specificity and trait anger (Jones et al., 1999), the prevalence of intrusions (Maurex et

al., 2010; Kremers et al., 2004), or avoidance towards intrusions (Maurex et al., 2010; Kremers et al., 2004; 2006a).

In sum, it can be concluded that neither PTSD nor the severity of other symptoms of psychopathology (depression, anxiety, or BPD) relate to OGM in BPD patients. With respect to BPD associated symptoms, the low number of available studies does not allow us to draw clear conclusions. Results regarding the role of MDD suggest that memory specificity in BPD is at least in part associated with MDD (Artnz et al., 2002; Kremers et al., 2004; Spinhoven et al., 2007; Van den Broeck, 2012), although there are contradicting findings (Maurex et al., 2010; Reid & Startup, 2010; Renneberg et al., 2005). Finally, given the current studies, a relationship between memory specificity and a diagnosis of BPD cannot be ruled out either. Data of Jones et al. (1999), Maurex et al. (2010), and Reid and Startup (2010) suggest that OGM and a diagnosis of BPD are associated, whereas data of Arntz et al. (2002), Kremers et al. (2004), and Renneberg et al. (2005) found no association.

OGM IN RELATION TO SOCIO-DEMOGRAPHICS AND AMT CHARACTERISTICS IN BPD PATIENTS

This section first overviews findings on whether or not OGM is associated with socio-demographic variables, such as gender, marital status, age, and education (in terms of years or level of education). We then describe the associations between memory specificity on the one hand, and cue valence, retrieval latency, and the extent to which cues are meaningful for the respondent ('cue discrepancy') on the other hand.

OGM has not been found to be associated with gender (Arntz et al., 2002; Kremers et al., 2004) or marital status (Arntz et al., 2002). Age was sometimes found to be negatively correlated with memory specificity (Artnz et al., 2002; Maurex et al., 2010; and Spinhoven et al., 2007, when cue discrepancy was taken into account), but not always (Kremers et al., 2004; Renneberg et al., 2005; Spinhoven et al., 2007). Education (in terms of years or level of education) was found to correlate positively with memory

specificity (Arntz et al., 2002; Maurex et al., 2010), or negatively with OGM (Spinhoven et al., 2007). This is in line with previous findings in traumatised (e.g., Schönfeld & Ehlers, 2006), depressed, anxious and healthy participants (e.g., Wessel, Meeren, Peeters, Arntz, & Merckelbach, 2000). Nevertheless, after controlling for educational level, group differences generally remain (Williams et al., 2007), suggesting that education only explains part of the variance.

Kremers et al. (2004) found no main effect of cue valence on memory specificity in BPD patients. However, according to Jones et al. (1999), BPD patients retrieved more generic memories following negative cues than after positive or neutral cues. Renneberg et al. (2005) found that healthy controls, depressed controls as well as BPD patients retrieved more specific memories following negative cues than after neutral or positive cues. Kremers et al. (2006a) found the opposite in a BPD sample that had followed long-term psychotherapy. Regardless of BPD, samples of depressed and traumatised patients also show mixed evidence with regard to whether memory specificity varies with the valence of the cue (Williams et al., 2007). Meta-analyses by van Vreeswijk and de Wilde (2004) and by Williams et al. (2007) suggest that OGM generally emerges following both positive and negative cues.

Renneberg et al. (2005) were the only researchers to investigate latency when retrieving specific memories. In general, BPD patients do not differ in retrieval latency for specific memories from depressed or healthy controls, although they tend to retrieve memories faster than MDD patients. Specific memories following negative cues were found to be retrieved the fastest.

As described above, according to the Self-Memory System, cues that tap into domains that are highly discrepant from one's actual self would be more likely to evoke OGMs. Van den Broeck et al. (2012) computed an index expressing the degree to which the AMT as a whole was discrepant towards a respondent's actual self-concept. This index was negatively and highly correlated with memory specificity in their depressed BPD patients, $r = -.89$, $p < .01$ (but not in the non-depressed BPD subsample). These findings

are in line with what has previously been found in remitted depressed patients (Crane et al., 2007). Also suggesting that memory specificity in (depressed) BPD patients depends, at least in part, on the meaning the cues have for the respondents, Spinhoven et al. (2007, study 2) discovered that BPD patients retrieved less specific memories in response to cues that were thematically related to a participant's relevant set of dysfunctional attitudes[5]. These findings match earlier findings in (remitted) depressed participants (Barnhofer et al., 2007; Spinhoven et al., 2007, study 1).

In sum, we can conclude that results regarding the association between memory specificity and cue valence are varied. Regarding the impact of the meaning of the cues, findings are limited, but they seem to suggest that highly sailliant cues are more likely to evoke general memories, whether they tap into a domain that is highly discrepant towards one's self-concept, or whether they closely match one's dysfunctional self-beliefs.

METHODOLOGICAL ISSUES

The present findings consistently suggest that OGM in BPD is reliably associated with educational level, and that illness severity or PTSD are unrelated to memory specificity in this group of patients. However, the studies presented above are inconclusive on whether or not OGM is directly associated with a diagnosis of BPD and/or MDD in BPD. Several reasons prevent us from drawing unambiguous conclusions in this regard.

First, contrasting results regarding a possible association between OGM and diagnosis of BPD may result from methodological and sample differences between the studies.

[5] Dysfunctional attitudes, such as "If I fail partly, it is as bad as being a complete failure" (item 14 from the Dysfunctional Attitude Scale (DAS; Weissman & Beck, 1978)), are thought to be indicatory for maladaptive schemas that may trigger self-referent thinking.

Table 3 shows that studies differed in samples (outpatients, inpatients, different exclusion criteria, e.g., participants with substance abuse were sometimes excluded and in other studies included, or special demands, e.g., a certain amount of suicide attempts) and control groups (clinical groups, healthy controls, no control group). In fact, the hypothesis that BPD patients show OGM seems to hold in BPD outpatients when compared to healthy controls (Jones et al., 1999; Maurex et al., 2010; Reid & Startup, 2010), but not in BPD inpatients (Jørgensen et al., 2012; Renneberg et al., 2005), or when compared to other clinical samples (Arntz et al., 2002; Jørgensen et al., 2012). Furthermore, except for Jørgensen et al. (2012), all the studies presented above used the Autobiographical Memory Test (AMT). These AMTs varied in number of stimuli (10 to 36), kind of stimuli (nouns, adjectives, or both, or traits), stimulus presentation (verbally, visually, or both), response time (30s or 60s), response requirements (verbally or written), and scoring procedure (AMTs were mostly scored by researchers only, however, using a written AMT, Van den Broeck et al., 2012, asked their respondents to score each of their memories as specific, categorical, or extended. Afterwards, the memories were systematically scored by the researchers in order to correct incorrect judgements. Supplementary scoring categories were also added in this phase). Most authors were interested in the number or percentage of general (Jones et al., 1999; Startup et al., 2001), general categorical (Maurex et al., 2010; Renneberg et al., 2005; Reid & Startup, 2010), or specific memories (Arntz et al., 2002; Kremers et al., 2004; 2006a; 2006b; Maurex et al., 2010; Reid & Startup, 2010; Renneberg et al., 2005; Spinhoven et al., 2007), however Van den Broeck et al. (2012) used the proportion (this is, percentage corrected for the presence of omissions) of specific memories. Griffith et al. (2012) describe in more detail how these variables may influence AMT outcome and complicate comparability. Jørgensen et al. (2012) used a completely different

methodology to collect memories by asking respondents "to write down three memories that are most central to one's life story"[6]. No explicit instruction to recall *specific* memories was included. Therefore, comparability of the specificity scores obtained from this procedure with those obtained from the traditionally used AMT may be questioned.

Second, over the past 25 years, OGM has mainly been studied in relation to MDD and trauma. Axis II disorders were often not diagnosed, nor were they explicitly excluded. It is only reasonable to expect that many samples will definitely have included BPD patients, given that lifetime prevalence of BPD in patients diagnosed with MDD or PTSD is estimated at 11.5% and 24.3%, respectively (Grant et al., 2008). Moreover, some authors (e.g., Williams & Broadbent, 1986) only included patients who had reported suicidal gestures just before test admission. It is of relevance to note that surprisingly few publications are available that specifically focussed on BPD patients alone.

Third, except for Kremers et al. (2004) and Maurex et al. (2010), none of the studied samples exceeded 35 BPD patients. According to DSM-IV (APA, 1994), a BPD diagnosis requires the presence of at least five out of nine distinguished criteria, leading to a wide variety of BPD phenotypes. Theoretically, 256 different BPD phenotypes are possible. Studying a limited sample size of 30 BPD patients, as is often the case in the studies of interest, may not cover the heterogeneity and complexity of BPD diagnoses. Therefore, inconsistent findings may be an artefact of sample selection, or, alternatively, when samples consist of many different BPD phenotypes, unique associations, for instance between OGM and suicidal gestures, may not be revealed.

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[6] Jørgensen et al. (2012) used a modified version of the Life Story Event Task (Rubin, Berntsen, & Hutson, 2009). Two independent raters agreed in 87% of the cases in judging memory specificity.

Finally, potentially important factors are often neglected in the studies that have been conducted until now. For example, none of the studies controlled for medication or substance use, and only some studies took education or trauma (exposure) into account. Nevertheless, Kremers et al. (2006a) suggested that the complexity or the severity of the trauma may co-determine OGM. Furthermore, Van den Broeck et al. (2012) argued that depressive status in BPD patients could be considered in terms of affective instability following traumatic experiences, thereby differing from MDD in non-BPD patients.

Overall, up to now, conclusions on the association between OGM and BPD are confounded by differences in samples and instruments, and by the heterogeneity of the BPD diagnosis which is not reflected in the small sample sizes that have been studied so far. The robustness with which OGM has been found in traumatised or depressed patients strongly contrasts with the minority of available publications that specifically focussed on OGM in BPD, although it is possible that BPD patients make up part of the traumatised and depressed samples in which OGM has been identified. Finally, current studies may have neglected meaningful variables that may contribute to OGM in general or in BPD in particular, such as medication or substance (ab)use, affective instability, or characteristics of trauma exposure.

CONCLUSIONS AND DIRECTIONS FOR FUTURE STUDIES

According to the CaR-FA-X model (Williams et al., 2007), OGM results from ruminative and self-focused processes (CaR), functional avoidance (FA), limited executive resources (X), or from an interplay between these variables. Because these processes have been repeatedly demonstrated in depressed and traumatised patients, the applicability of the framework is justified in these clinical groups (Williams et al., 2007).

In BPD patients, visual (Maurex et al., 2010) and verbal (Reid & Startup, 2010) working memory and education, which may also to some extent reflect executive functioning (X;

Reid & Startup, 2010), have been found to be associated with memory specificity (Arntz et al., 2002; Maurex et al., 2010; Spinhoven et al., 2007).

Rumination (CaR), on the other hand, has not been found to be associated with OGM in BPD patients, at least not after controlling for depression severity (Van den Broeck et al., 2012). Furthermore, avoidance of intrusions (Maurex et al., 2010; Kremers et al., 2004; 2006a), and dissociation, which can be considered as the ultimate avoidance strategy (FA; Kremers et al., 2004; 2006a; Renneberg et al., 2005), have systematically been shown to be unrelated to memory specificity in BPD patients – although Jones et al. (1999) found that dissociation scores were positively associated with more general memories. These findings question the applicability of the CaR-FA-X model and its predecessors for explaining potential OGM in BPD patients.

Although many BPD patients report dissociative episodes, BPD patients are often clinically described as easily getting overwhelmed by their emotions. Linehan (1993) additionally mentions relatively low thresholds for emotional reaction and highly intense feelings in BPD patients, meaning that just minor stressors (or memories) can make them seriously upset. Non-BPD subjects, who can tolerate more stress before an emotional reaction is evoked, might have the opportunity to apply other strategies on stressors before threshold values are exceeded. They might, for instance, increase the psychological distance towards emotional events by not exploring all the details of an event (or by not recalling all the details of a memory; OGM). OGM could thus be considered as a (unconscious, passive, pre-emptive) mechanism by which one alters a memory, in a way that one's threshold will be less likely to be exceeded by it.

Linehan (1993) further assumes that stress reduction is slower in BPD patients compared to people without BPD ('slow return to baseline'). It is hypothesised that, by the time the emotional reaction to a stressor has faded, a new experience starts another series of intense feelings, preventing adequate emotion regulation. In fact, BPD patients risk moving further away from the baseline instead of approaching it. At extreme levels, the only way to return to baseline quickly may seem to be to perform

extreme acts. Indeed, the clinical presentation of BPD suggests that BPD patients apply more stringent methods of emotion regulation such as self-injurious behaviours or dissociation in an attempt to control difficult emotions. However, findings on cue discrepancy suggest that OGM is used in BPD patients when specific prompts are used (Spinhoven et al., 2007; Van den Broeck et al., 2012).

This idea closely relates to the inflexibility concept proposed by Debeer, Raes, Williams, and Hermans (2012), stating that healthy respondents would be more flexible in manipulating the specificity of their own memories during retrieval in response to situational demands when compared to clinical populations. This is considered an adequate reaction during daily life: one will be able to retrieve specific solutions out of memory in response to problems one is confronted with, and one would recall at a more general level when it is inappropriate to get overwhelmed by emotions and the memory threatens to do so. Depressed and traumatised patients then, are thought to be inflexibly overgeneral, whereas BPD patients may be inflexibly specific, both leading to deficient emotion regulation and processes maintaining the disorder. The overgeneral memory style of depressed patients, for instance, prevents them from correcting their experiences and schemas about their selves, the world and the others by not incorporating contradicting specific information. In contrast, the specific style of BPD patients may impede the construction of a solid self-concept and trustworthy and predictable descriptions of others. According to the Self-Memory System (Conway, 2005), information is hierarchically stored. Information selectively derived from event-specific knowledge at the lower levels is integrated into higher-order (thematic or time) categories, that are conceived as being part of one's conceptual self (Conway et al., 2004). The SMS thus suggests that the creation of self- (and other?-) descriptions that are coherent over time and across experiences requires the ability to somehow reflectively zoom out, thereby selectively neglecting event specific knowledge (the concept of narrative identity as conceptualised by, e.g., McAdams & Pals, in Shiner,

2009, may also be of relevance here). Being inflexibly specific, BPD patients may be failing to chunk event specific knowledge into higher order categories.

Further research is necessary to test the value of cognitive flexibility as a mediator between one's personal reactivity (thresholds) and final affect. If so, studies should also investigate to what degree, and how (in)flexibility can be changed during therapy. Kremers et al. (2006a, p. 490) state that "the defensive function of an overgeneral memory style might not be adequate when traumatic events as complex and severe as often is the case in patients with BPD are involved", suggesting that flexibility may turn into inflexibility following severe trauma. Can it be turned around?

Nevertheless, it should be noted that the available studies are rather limited in number, making it difficult to truly investigate the applicability of the CaR-FA-X model in BPD patients. Future studies should therefore study the associations between OGM and working memory, rumination, and avoidance measures in BPD patients.

In addition, the current findings do not sufficiently exclude the possibility that OGM in BPD is mainly associated with co-morbid MDD[7] or exposure to trauma. Therefore, future studies should carefully record respondents' history and severity of MDD and trauma, as well as other potentially influential factors such as medication use and substance abuse. Furthermore, given the heterogeneity of the BPD diagnosis, future studies should also include large samples of BPD patients in order to study whether or not OGM in BPD is associated with one or more specific BPD criteria, and to assure whether the current findings are not due to selection effects.

As outlined above, the clinical burden of BPD is large, for patients as well as for their social context. Patients and society would therefore benefit from a clear understanding

[7] Although depression in BPD may differ from depression in MDD (see, e.g., Van den Broeck et al., 2012 – Chapter 3).

of information processes in these patients, being both a target for therapy as well as the medium by which therapy works. Studying autobiographical memory in BPD is particularly relevant, because of its role in the formation of one's sense of self, which is by definition (APA, 1994) unstable in BPD patients. As for now, the current theories on autobiographical memory organisation seem to apply insufficiently to BPD, although the idea of cognitive flexibility may open up interesting perspectives. We formulated a number of issues that should be taken into account when conducting future research, in order to control for methodological concerns and the complexity of the BPD diagnosis.

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Memory Specificity in Borderline Personality Disorder: Associations with Depression and Self-Discrepancy

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ABSTRACT

Reduced memory specificity (RMS) is a robust finding in (previously) depressed patients and patients suffering from post-traumatic symptoms. It has been associated with depression severity, rumination, and – more recently – with cue content (e.g., cues referring to highly discrepant self-guides are assumed to hinder specific memory retrieval more likely than cues that match one's self-concept). In this study we have investigated the presence of these relationships in 34 patients diagnosed with borderline personality disorder (BPD). All participants completed the Self-Description Questionnaire (SDQ), the Autobiographical Memory Test (AMT), the Beck Depression Inventory (BDI-II), and the Ruminative Response Scale (RRS). First, it was observed that both rumination and depression severity were associated with RMS. However, when confounding between rumination and depression severity was considered using partial correlations, only depression severity was found to be significantly associated with RMS. Second, in the currently depressed BPD patients (n = 11), memory specificity was significantly related to cue content suggesting that, at least for depressed BPD patients, RMS is related to the extent to which cues activate highly discrepant personal domains. Although our data suggest that depression severity as well as current depression (in interaction with cue content) play an important role in the occurrence of RMS in BPD, we will discuss that these findings could be moderated by post-traumatic stress and/or executive functioning.

INTRODUCTION

First described by Williams and Broadbent (1986), reduced memory specificity (RMS) is often observed in depressed, previously depressed, and traumatised patients (for an overview, see Moore & Zoellner, 2007; Williams et al., 2007). RMS refers to the difficulties these clinical groups experience in retrieving specific information from their autobiographical memory, typically assessed using the Autobiographical Memory Test

(AMT; Williams & Broadbent, 1986). In this task, respondents are asked to recall specific memories in response to cue words. Instead of recalling, as instructed, detailed information on 'personally experienced events that happened only once and did not last longer than one day', the aforementioned patients regularly respond with general (categorical) rather than specific recollections (e.g., "every time I play tennis", rather than "that one time I broke my racquet in that thrilling tiebreak against my brother.").

In relation to mood, RMS is found to be associated with delayed recovery from depressive episodes or future mood disturbances (e.g., Brittlebank, Scott, Williams, & Ferrier, 1993; Gibbs & Rude, 2004; Hermans et al., 2008; van Minnen, Wessel, Verhaak, & Smeenk, 2005). It has been suggested that RMS more strongly relates to diagnostic status of depression than to depression severity (Williams et al., 2007). In relation to trauma, Moore and Zoellner (2007) concluded in their review that "post-traumatic symptoms, rather than trauma exposure per se, are associated with overgenerality" (p. 433). Furthermore, RMS is also found to be associated with poor problem solving abilities (e.g., Goddard, Dritschel, & Burton, 1996; Sutherland & Bryant, 2008), higher levels of rumination (e.g., Raes et al., 2005; Watkins & Teasdale, 2001), and feelings of hopelessness (Williams et al., 1996).

All above-mentioned associations taken into account, one would expect patients diagnosed with borderline personality disorder (BPD), too, to have difficulties retrieving specific memories. First, depression and trauma are common phenomena in BPD patients. Zanarini, Frankenburg, Hennen, Reich, and Silk (2004) conclude that even after treatment 61% of the BPD patients meet criteria for major depression, and 35% meet criteria for post-traumatic stress disorder. Second, BPD patients often ruminate (e.g., Smith, Grandin, Alloy, & Abramson, 2006), and they have difficulties to adequately solve problems (Kremers, Spinhoven, van der Does, & van Dyck, 2006b; Maurex et al., 2010; Reid, 2008).

The number of studies published so far that have focused on RMS in BPD, is still relatively small (n=9). Differences in RMS between patients with and patients without

BPD have found to be mediated by differences in IQ and education (Reid & Startup, 2010), and RMS in BPD has found to be associated with poor social-problem solving capacity (Kremers et al., 2006b; Maurex et al., 2010; Reid, 2008) and with less para-suicidal acts (Startup et al., 2001). But in relation to mood, most of these studies have shown that RMS in BPD is unrelated to depressive status (Maurex et al., 2010; Reid & Startup, 2010; Renneberg, Theobald, Nobs, & Weisbrod, 2005) or depression severity (Jones et al., 1999; Kremers, Spinhoven, & van der Does, 2004; Kremers et al., 2006a; Maurex et al., 2010; Renneberg et al., 2005). However, Kremers and co-workers (Kremers et al., 2004; 2006a) did find RMS in the clinically depressed subgroup of their borderline sample, independent of depression severity. Also Arntz, Meeren, and Wessel (2002) found RMS to be related with a diagnosis of MDD, independent of a diagnosis of BPD. Reid (2008) suggests that borderlines' memory specificity is situated in between the specificity levels of depressed and normal controls, being closer to the latter. Given these inconsistent findings, the first aim of this study was to further elucidate the relationship between RMS and depression and depression severity in BPD.

As theories and studies on RMS in depression evolved, rumination has been considered as an important mediating factor in the relation between depression and RMS (e.g., Kleim & Ehlers, 2008; Raes, Hermans, Williams, Beyers, et al., 2006), and, to a lesser extent, in the relation between post-trauma psychopathology and RMS (Kleim & Ehlers, 2008). Rumination, defined as "repetitively thinking about one's (depressed) feelings and about their causes, meanings, and consequences" (Nolen-Hoeksema, 1991, p. 569), is known to be associated with increased vulnerability for depressive episodes or symptoms (for a review, see Watkins, 2008). In addition, a considerable body of correlational (e.g., Raes, Hermans, Williams, Beyers, et al., 2006; Raes, Hermans, Williams, Demyttenaere, et al., 2006; Watkins & Baracaia, 2002), as well as experimental (e.g., Watkins & Teasdale, 2001, 2004; Watkins, Teasdale, & Williams, 2000) evidence has emerged during the last decade, showing that RMS in depression is significantly associated with rumination. Moreover, RMS and rumination appear

mutually reinforcing vulnerability factors for depression (Debeer, Hermans, & Raes, 2009). As far as we know, the relationship between rumination and RMS in BPD patients has not previously been studied, however. Hence, the second aim of this study was to investigate the relations between rumination, RMS, and depression in BPD patients.

Recently, it has been suggested that autobiographical memory specificity in clinical groups also depends on the content of the information that has to be retrieved. Or, more precisely, on the meaning the information has for the respondent (Barnhofer, Crane, Spinhoven, & Williams, 2007; Crane, Barnhofer, & Williams, 2007; Dalgleish et al., 2003; Spinhoven, Bockting, Kremers, Schene, & Williams, 2007). These predictions are based on the Self-Memory System (SMS; Conway, 2005; Conway & Pleydell-Pearce, 2000; Conway, Singer, & Tagini, 2004), an influential model on (autobiographical) memory organisation. Basically, this model assumes that a lot of personally experienced events lead us to draw coherent conclusions, named schemas or self-concept, about 'who' we actually are and 'how' we function. Additionally, the self is supposed to contain ideas about how we ideally would like to be or how we ought to be according to our own or others' standards. These ideas are referred to as self-guides (e.g., Higgins, Strauman, & Klein, 1986) or goals (Conway et al., 2004). Discrepancies between one's self-concept and these goals will evoke a kind of discomfort, which will motivate one to change one's behaviour, which in time will lead to adjusting the ideas about oneself. Discomfort evoked by discrepancies between one's actual and one's ideal self is assumed to give rise to feelings of dejection, whereas discomfort related on discrepancies between one's actual and one's ought self will rather elicit feelings of agitation. Indeed, in depressed patients actual-ideal discrepancies appear more prominently present, whereas in anxious subjects the actual-ought discrepancies are more important (e.g., Higgins, Bond, Klein, & Strauman, 1986; Strauman, 1989). In 2004, Conway et al. have defined the Working Self (WS), which is responsible for (1) maintaining an integrated sense of self-identity (i.e. self-coherence) and (2) monitoring

progress in goal-directed activities (i.e. adaptive correspondence). With the latter Conway et al. (2004) refer to the encoding and use of information related to here-and-now experiences that are relevant in the light of the ongoing goal-attainment processes. In order to construct an accurate, integrated and stable sense of self, the WS operates to make information that supports current self-concepts highly available, but in order to change towards one's goals the WS should also focus on episodic clues that give information on goal-attainment. Problems arise when challenges towards goal progress appear. If the discrepancies between the actual self and one's personal goals are largely emphasised, e.g., in case of traumatic experiences or in self-referent thinking by depressed patients, the stability of the self gets threatened. According to the SMS, resources are then shifted away from adaptive correspondence to self-coherence in order to maintain or stabilise the self by trying to resolve the present discrepancies. In case of intentional search processes, no resources will be available to retrieve event-specific knowledge, therefore increasing the likelihood of retrieving general memories[8].

The SMS thus suggests that it would be more difficult (or unlikely) for a depressed respondent to recall specific information on a topic that relates to one of his ideals that significantly differs from the person's actual view of the self. Indeed, Crane et al. (2007) found a negative correlation between the number of self-relevant AMT cues and total memory specificity in previously depressed individuals. Likewise, Spinhoven et al. (2007) and Barnhofer et al. (2007) found that less specific memories were retrieved in response to cues that were thematically related to a participant's relevant set of

[8] This more or less connects with the idea that an overgeneral memory style may function as a protective mechanism in order to avoid the reactivation of painful memories and the related discomfort evoking sensory and perceptual features ('affect regulation hypothesis', Williams, 1996; 'functional avoidance', Williams et al., 2007).

dysfunctional attitudes[9] concerning 'need for approval' in (remitted) depressed patients. In addition, Barnhofer et al. (2007) found that the association was moderated by executive capacity. Finally, Spinhoven et al. (2007) were able to replicate these findings in borderline patients. The third and final aim of this study, therefore, was to investigate the relationships between the meaning of the cues and memory specificity in BPD patients.

In summary, the main aims of the present study are to get a clearer view on the relationships between (1) RMS and depression (severity); (2) RMS and rumination; and (3) RMS and cue content in BPD patients. First, given the fact that the current balance of evidence suggests that there is no association between memory specificity and depression (severity) in BPD (see Jones et al., 1999; Maurex et al., 2010; Reid & Startup, 2010; Renneberg et al., 2005, and to a lesser extent also Kremers et al., 2004; 2006a) we did not expect to find a relation either. Second, given the established relations between RMS on the one hand and depression and rumination on the other in (previously) depressed patients, and given the fact that many BPD patients are (or have previously been) diagnosed with MDD and PTSD as well, we hypothesise that there will be a negative correlation between memory specificity and rumination in BPD patients. Finally, focusing on the impact of cue content on overgeneral memory retrieval, we hypothesise that (1) less specific memories will be retrieved in response to AMT cues that closely approach highly relevant personal themes and (2) less specific memories will be retrieved in response to cues that relate to highly discrepant personal domains.

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[9] Dysfunctional attitudes, such as "If I fail partly, it is as bad as being a complete failure" (item 14 from the Dysfunctional Attitude Scale (DAS; Weissman & Beck, 1978)), are thought to be indicatory for maladaptive schemas that may trigger self-referent thinking. Two sets of

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METHOD

PARTICIPANTS

Thirty-four participants (7 males) were recruited from the University Psychiatric Centre UPC KU Leuven, Campus Kortenberg (Belgium). All participants were diagnosed by an experienced psychiatrist. They all fulfilled DSM-IV criteria for BPD (APA, 1994). Except for 7 participants, all respondents had at least one co-morbid Axis I diagnosis. The most common Axis I diagnoses were Substance Abuse (*n* = 8), Adjustment Disorder (*n* = 7, of which 6 with depressive mood), Eating Disorder (*n* = 5), and Depressive Disorder (*n* = 5, of which 4 MDD and 1 Depressive Disorder NOS). Therefore, 11 participants were considered as currently depressed (5 patients with Depressive Disorder and 6 with Adjustment Disorder with depressive mood). All participants were hospitalised on a unit specialised in treating BPD using principles of Dialectical Behavioural Therapy (DBT; Linehan, 1993). Participants were between 17 and 48 years of age (*M* = 27.21; *SD* = 9.05). Most participants were single (73.5%) and unemployed (38.2%), and had had previous residential psychiatric treatment (*M* = 2.35; *SD* = 1.86; range: 0–8).

INSTRUMENTS

Self-Description Questionnaire (SDQ, Crane et al., 2007; non-published Dutch adaptation by Van den Broeck, Claes, & Raes, 2008). Originally developed by Higgins, Klein, and Strauman (1985) to measure the actual, ideal and ought selves (see Appendix A, p. 235, for definition), the Selves-Questionnaire has often been adapted (e.g., Carver, Lawrence, & Scheier, 1999; Crane et al., 2007; Strauman, 1992). We translated the version of Crane et al. (2007) into Dutch and replaced the 8-point Likert scales

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attitudes in particular are related to depression: 'need for approval by others' and 'performance evaluation'. These can be assessed using the DAS (Weissman & Beck, 1978).

by 100 mm visual analogue scales (VAS). First, participants were asked to describe their actual self by means of seven characteristics. For each of the actual self-descriptions participants reported, they had to fill out one VAS, measuring the extent to which respondents believe they *actually* possess the cited characteristic *at the present moment*. Afterwards, participants were asked to describe their ought, ideal and feared selves respectively, again each time by means of seven characteristics. For each of the self-guides cited by these discrepant selves, two VAS were presented. On the first VAS, respondents were asked to indicate to what degree they ought to have, ideally would like to have or feared to have the self-guides they had written down to describe their ought, ideal and feared self respectively. As for attributes formulated as characterising the actual self, participants were asked to indicate on the second VAS to what degree they actually possessed each of the cited self-guides at the present moment. This procedure allowed us to calculate discrepancy scores between ought self and actual self, between ideal self and actual self, and between feared self and actual self by subtracting the position on the second scale from the score on the first scale.

Autobiographical Memory Test (AMT, Williams & Broadbent, 1986; Dutch written version, see e.g., Raes et al., 2008). In a first phase participants were presented with 18 written cue words (9 positive and 9 negative): *happy, sad, safe, angry, interested, clumsy, successful, emotionally hurt, surprised, lonely, relaxed, guilty, proud, afraid, pleasant, cowardly, carefree,* and *lazy*. They were instructed to write down specific autobiographical memories in response to each of the cue words. The definition of a specific autobiographical memory was explained to them by using an example. In a second phase they were asked to go over their responses again and to score each of the retrieved memories as '1' (being a specific memory); 'M' (being a categorical memory) or '>' (being an extended memory). Afterwards the memories were systematically scored by the researchers in order to correct incorrect judgements by the participants. Scoring categories 'No memory/Semantic association', 'Omission' and 'Same event' were also added in this phase. Variables of interest are the proportion of specific

memories, and proportion of general categoric memories. This version of the AMT has been previously successfully used to assess autobiographical memory specificity (e.g., Henderson, Hargreaves, Gregory, & Williams, 2002; Raes et al., 2008; Raes, Williams, & Hermans, 2009). We found a satisfactorily interrater reliability in our sample, r = .82[10].

Beck Depression Inventory-II (Beck, Steer, & Brown 1996; authorised Dutch translation (BDI-II-NL) by van der Does, 2002). This self-report questionnaire measures depression severity. It consists of 21 items, each representing a specific depressive symptom (e.g., pessimism, guilt, suicidal ideations). An item consists of four statements indicating different levels of severity. Participants were asked to mark the statements that best describe how they felt during the last two weeks, the current day included. Item scores differ from 0 to 3; total score ranges from 0 to 63 with higher scores indicating higher levels of depressive symptoms. The internal consistency of the total BDI-II-NL in our sample was high (Cronbach's alpha = .93).

Ruminative Response Scale (Treynor, Gonzalez, & Nolen-Hoeksema, 2003; authorised Dutch translation (RRS-NL) by Raes & Hermans, 2007). The RRS-NL consists of 22 items and measures rumination during depressive state. Items have to be scored on a 4-point Likert scale (*almost never* to *almost always*), indicating how often a ruminative response is present when one is feeling down. Adequate reliability and good convergent and discriminant validity are reported (see Schoofs, Hermans, & Raes, 2010). Internal consistency of the total RRS-NL in our sample was high (Cronbach's alpha = .84).

[10] We would like to thank Katleen Hoing for her contributions in order to determine interrater reliability.

PROCEDURE

Following oral informed consent, participants were tested in groups of 2 to 8 people. They were asked to fill out the questionnaires in the order presented above. No time limits were set.

ANALYSES

In order to test our hypotheses concerning the relationships between cue content and RMS, we first calculated two indices, combining SDQ results and the content of AMT cues, and, secondly, computed correlations between these indices and the proportion of specific memories retrieved.

The first index, IrT, expressed the degree to which the AMT as a whole was *relevant* for the respondent, based on all the self-guides given on the SDQ (hence 'T', for *total*). To create this index, we combined each AMT cue with each self-guide that was produced by the participants to describe their ideal, ought or feared self. In total, participants produced 268 different self-guides, leading to 18 x 268 = 4824 word pairs. These word pairs were randomly allocated to 72 lists, making 67 matches per list. These lists were put online, using the open source survey service Limesurvey.org. We asked a panel of volunteers to rate for each pair of words to which degree they felt these words were synonymous, using a visual analogue slider, ranging from -100 to 100. Two hundred and ninety six volunteers (95 males) filled out this online instrument. These respondents were between 18 and 73 years of age (M = 37.75, SD = 13.25). Most volunteers were married (53.0%) and worked (76.7%). Fifty-two percent of these respondents had completed university. For each word pair a mean synonymy score over the volunteers was calculated. Since we were interested in relevance, we used absolute values of (the means of) the synonymy scores. For practical reasons we simplified the scale to scores ranging from 0 through 10. We created the IrT by computing the mean over all

(adapted) synonymy scores between all AMT cues and all self-guides a participant reported.

A second index, IdT, expresses the degree to which the AMT is *discrepant* in relation to the *total* of self-guides formulated by respondents on the SDQ sections on the ought, ideal and feared selves. To create this index, we multiplied the aforementioned discrepancy scores by the corresponding synonymy scores as defined above. Finally we computed the mean over all variables that were relevant for all ought, ideal and feared self-guides.

RESULTS

DESCRIPTIVE STATISTICS OF THE USED MEASURES

Table 4 summarises the means, standard deviations and ranges on all included variables. Because we asked participants to rate for each self-guide their discrepant as well as their actual position, we were able to calculate the magnitudes of the discrepancies. Most participants had no trouble to formulate enough self-discrepancies and self-guides, but one participant did not complete the SDQ. His data were excluded from the analyses.

In terms of depression severity, most participants were considered severely depressed (71.9% scored above the BDI-II cut-off score of 28 points). One out of eight participants (12.5%) reported minimal complaints (range 0-13), 9.4% had scores indicating mild depression (14-19) and 6.2% of our participants were moderately severely depressed.

The currently depressed participants did not differ from the currently non-depressed participants on the variables mentioned in Table 4, except for the feared-actual discrepancy scores (magnitude), which is smaller for the currently depressed participants, $F = 5.76$, $p = .023$.

Table 4 Descriptive statistics of the measures used

	M	SD	Range
Self-Description Questionnaire (SDQ)			
Number of actual self-guides	6.38	1.23	3 – 7
Number of ought self-guides	6.00	1.58	1 – 7
Number of ideal self-guides	6.15	1.25	3 – 7
Number of feared self-guides	5.88	1.49	2 – 7
Ought-Actual discrepancy (magnitude)	37.16	35.64	-69.20 – 92.57
Ideal-Actual discrepancy (magnitude)	47.70	34.40	-88.33 – 88.00
Feared-Actual discrepancy (magnitude)	71.21	26.27	14.67 – 115.50
Autobiographical Memory Test (AMT)			
N / % specific memories	11.50 / .69	4.31 / .23	0 – 18
N / % general categoric memories	2.32 / .15	1.97 / .13	0 – 7
N / % general extended memories	.65 / .04	1.07 / .06	0 – 4
N / % no memory retrievals	1.09 / .08	1.50 / .14	0 – 6
N / % same event retrievals	.12 / .01	.33 / .02	0 – 1
N no response retrievals	1.68	3.41	0 – 12
Beck Depression Inventory II (BDI-II)	33.31	12.97	7 – 61
Ruminative Response Scale (RRS)			
Total score	59.68	8.37	42 – 77
Reflection scale	11.24	3.28	5 – 18
Brooding scale	14.53	2.18	11 – 19

THE RELATIONSHIP BETWEEN MEMORY SPECIFICITY, DEPRESSION (SEVERITY), AND RUMINATION

As is shown in Table 5, no association was found between memory specificity and diagnosis of depression. In contrast, the proportion of specific memories and depression severity as measured with the BDI-II are negatively associated, $r = -.52$, $p < .01$. This association remains significant when we control for diagnosis of depression, $r = -.49$, $p < .01$, suggesting that, at least in this sample of BPD patients, the relationship

between memory specificity and depression severity is independent of depressive state. Indeed, the proportion of specific memories retrieved does not differ between depressed and non-depressed participants, $F(1, 32) = 2.50$, $p = .12$ (nor does the proportion of categoric memories retrieved, $F(1, 32) = .72$, $p = .40$). Moreover, associations between RMS and depression severity are high, as well in the depressed as in the non-depressed participants, $r = -.63$, $r = -.44$, respectively, both ps $< .05$, and these correlations do not differ from one another, $z = -.64$, $p = .52$.

Table 5 Correlations between the proportions specific and categoric memories, rumination, depression, and depression severity

	% GC	RRS-total	Depressive status	BDI-II-total
% S	-.66**	-.38*	.27	-.52**
% GC	-	.24	-.15	.29
RRS-total		-	-.34	.58**
Depressive status			-	-.30
BDI-II-total				-

%S = proportion specific memories retrieved during AMT administration; %GC = proportion general categoric memories retrieved during AMT administration.

* $p < .05$, ** $p < .01$.

Furthermore, the results in Table 5 show that the proportion of specific memories and rumination are negatively associated, $r = -.38$, $p < .05$. However, p-level drops beneath significance level once depression severity scores are partialled out , $r = -.11$, $p = .58$, suggesting that lack of specificity in our sample is associated with depression severity and that the zero-order relation with rumination is explained by its association with severity of depressive symptoms.

THE RELATIONSHIP BETWEEN MEMORY SPECIFICITY AND CUE CONTENT

As mentioned above, we hypothesised that (1) the more AMT cues tap into a domain that is highly relevant for the respondent, the lower the proportion of specific memories retrieved by the respondent will be, and (2) the more AMT cues are experienced as discrepant with one's actual state, the lower the proportion of specific memories retrieved will be. To test these hypotheses, we investigated the correlations between the proportion of specific and categoric memories retrieved in response to the AMT cues and the SDQ indices computed as described in the Analyses section. At first sight, the indices are not associated with memory specificity; IrT nor IdT correlated significantly with the proportion of specific memories, r = -.11, r = .17, ps = ns, respectively. There were no associations with the proportion of categoric memories either, r = -.02, r = -.06, ps = ns, respectively.

Table 6 Correlations between the proportion of specific and categoric memories and between the indices expressing the self-relevance (IrT) and self-discrepancy (IdT) of the AMT

	% S	**% GC**	**IrT**	**IdT**
% S	-	-.63**	.03	.40
% GC	-.76**	-	-.05	-.19
IrT	-.58	.07	-	.29
IdT	-.89**	.57	.78**	-

Data above the diagonal relate to the non-depressed patients (n = 22) or our sample; Data below the diagonal relate to our depressed subsample (n = 11).

%S = proportion specific memories retrieved during AMT administration; %GC = proportion general categoric memories retrieved during AMT administration; IrT = index expressing relevance of AMT in relation to all participants' self-guides produced during SDQ assessment; IdT = index expressing relevance of AMT in relation to all participants' self-guides produced during SDQ administration, also taken into account the discrepancies indicated by the participant.

* p < .05, ** p < .01.

Crane et al. (2007) found that cue content only related to memory specificity in remitted depressed patients, and Kremers et al. (2004; 2006a) found that a depressed subgroup of their borderline patients retrieved less specific memories compared to the non-depressed borderlines they examined. Inspired by these findings, we recalculated these correlations in the depressed and the non-depressed subgroups of our sample. These correlations are shown in Table 6. The correlations of the non-depressed subgroup are shown above the diagonal; under the diagonal the correlations of the depressed subgroup are displayed. In spite of the small selection – only 11 of our participants were currently depressed –, we now found that IdT was negatively and highly associated with memory specificity in the depressed subsample, r = -.89, p < .01, suggesting that depressed BPD patients have more difficulties retrieving specific memories as cues are more referring to self-discrepant domains. In marked contrast, this relation was reversed (but not significant) in the non-depressed participants, r = .40, p = .07. These correlations differed significantly, z = -4.38, p < .001[11].

Although not significant, we also found a positive association in the depressed subsample between IdT and the proportion of categoric memories, r = .57, p = .065, (significantly different from the corresponding r = -.19, p = .39 in the non-depressed participants, z = -1.99, p < .05). Furthermore, a negative association was found between

[11] This result was corroborated by a multiple hierarchical regression analysis predicting the (standardised) proportion of specific memories. Independent variables were all standardised. We entered depression severity on the first step, IdT and depressive status (non-depressed vs depressed) on the second step, and the interaction of IdT and depressive status on the third step. The overall model was significant, R^2 = .46, $F(4, 27)$ = 5.67, p < .005, with no significant effect of IdT and depressive status, $t(27)$ = .34, p = .74, β = .06, and $t(27)$ = .84, p = .41, β = .13 respectively. The interaction of IdT x depressive status, on the other hand, was held back as a significant predictor, $t(27)$ = -2.46, p = .02, β = -.42, as was depression severity, $t(27)$ = -2.20, p = .04, β = -.37, pointing out that the interaction between depressive status and IdT is the most important determinant in this regression analysis, even when controlled for depression severity scores.

IrT and the proportion of specific memories retrieved, r = -.58, p = .064. This final correlation does not differ from the corresponding r = -.03 in the non-depressed subsample, z = -1.62, p = .10. No association was found in either subsample between IrT and the proportion of categoric memories retrieved, r = -.05 for the non-depressed participants, and r = -.07 for the depressed participants respectively, both p = ns.

IrT and IdT were found to be unrelated to depression severity in the overall sample, r = .05, r = .14, ps > .44 respectively, as well as in the non-depressed participants, r = -.17, r = -.02, ps > .45 respectively. In the currently depressed participants, IdT related to depression severity, r = .71, p < .02, but IrT did not, r = .53, p = .10.

DISCUSSION

The aims of this study were threefold. First, we were interested to see what relationships could be found between memory specificity and depression (severity) in BPD patients. Second, we examined the relationship between memory specificity and rumination in BPD. Finally, based on recent theorising and empirical findings on the role of cue content in the retrieval process, we investigated whether memory specificity is influenced by the personal relevancy of AMT cues.

Regarding the associations between memory specificity and depression severity, and between memory specificity and rumination, we found that both depression severity and rumination were negatively associated with memory specificity in BPD patients, suggesting that the more severe one's depressive symptoms are, and the more one ruminates, the less one is capable of retrieving specific autobiographical memories. However, it should be noted that rumination and memory specificity were no longer significantly related when depression severity scores were partialled out. Furthermore, memory specificity and its relation with depression severity were independent of depressive state, and no direct association between memory specificity and depressive diagnosis was found. These findings suggest that depression severity is a more

important determinant of memory specificity in our BPD sample than rumination or depressive state.

Although our results do not deviate from what is generally found in depressed patients (e.g., Raes et al., 2005; Raes, Hermans, Williams, Beyers, et al. 2006; van Minnen et al., 2005), they are inconsistent with previous work that focused on the relation between memory specificity and depression (severity) in BPD (Arntz et al., 2002; Jones et al., 1999; Kremers et al., 2004; 2006a; Maurex et al., 2010; Reid & Startup, 2010; Renneberg et al., 2005). If any relation was found, memory specificity in BPD patients was related to depressive state (Arntz et al., 2002; Kremers et al., 2004; 2006a), but never to depression severity. Clear-cut explanations for our findings are lacking, though we would like to point out some considerations. First, the currently depressed and the non-depressed participants did not differ on any of the variables of interest (depression severity, memory specificity, rumination). Possibly, our research design may not have encountered important variables that either directly or indirectly (via depression severity) have influenced memory specificity. As mentioned before, differences in RMS between patients with and patients without BPD have found to be mediated by differences in IQ and education (Reid & Startup, 2010), and associations are reported with poor social-problem solving capacity (Kremers et al., 2006b; Maurex et al., 2010; Reid, 2008) and with less parasuicidal acts (Startup et al., 2001). Executive deficits or post-traumatic symptoms can therefore be considered as important missing variables. Second, but closely relating to the previous consideration, we should consider the possibility that depression in BPD differs in nature from depression in MDD. Possibly, depression in BPD should be considered in terms of affective instability following traumatic experiences. Finally, we should question why only a relatively small number of participants was acknowledged as currently depressed by the psychiatrist. Based on the cut-off scores mentioned in the BDI-II-NL Manual (van der Does, 2002) we can conclude that 78.1% of our respondents were considered (moderately) severely depressed, and that reported depression severity scores were high in the total sample

(*M* = 33.31; *SD* = 12.97). Measuring depression severity implicates measuring the absence or presence of symptoms, and vice versa. We could therefore wonder what exactly determines whether a psychiatrist judges someone as currently depressed or not. The use of a categorical diagnostic classification system as the DSM-IV (APA, 1994) may have some limitations on this behalf, since a diagnosis is made by judging the presence or absence of certain criteria, possibly without taking fully into account the severity of the total tableau of symptoms.

Regarding the relations between cue content and memory specificity, we expected participants to report less specific memories when AMT cues more closely relate to highly discrepant personal domains (high discrepancy) or to highly personal themes (high relevance). As for 'high discrepancy', we did not find a relation with memory specificity for the total sample. However, the currently depressed BPD patients in our sample did show a significant negative association between memory specificity and the extent to which the AMT cues referred to discrepant domains about the self (IdT). Furthermore, a nearly significant positive correlation between IdT and the proportion of categoric memories was found in this subsample. These correlations differed significantly from the corresponding correlations in the non-depressed participants. In addition, these findings were unrelated to depression severity. This pattern of results suggests that the more AMT cues are experienced as discrepant with one's actual self-perceptions, the more difficult it is to retrieve specific memories on that AMT, at least when one is currently depressed. As for 'high relevancy', we only observed a marginally significant negative association with memory specificity for the currently depressed BPD-patients in our sample, and this correlation did not differ from the corresponding correlation in the non-depressed participants. No associations were found between cue relevance and the proportion of categoric memories retrieved.

It has been proposed that the activation of schemas that are discrepant with actual self-schemas would demand a reallocation of resources in an attempt to reduce the present discrepancies, thereby hindering the retrieval of specific autobiographical information

(Conway et al., 2004; Dalgleish et al., 2003). As mentioned before, BPD patients are prone to rumination (Smith et al., 2006), which could be considered as a discrepancy-based thinking, directed at reducing the discrepancies (Crane et al., 2007). In addition, rumination has often been associated with RMS (e.g., see Debeer et al., 2009; Raes, Hermans, Williams, Beyers et al., 2006). Furthermore, BPD patients are typically characterised by an instable sense of self, suggesting that their WS processes are mostly involved in self-coherence rather than in adaptive correspondence (Parker, Boldero, & Bell, 2006). We therefore would expect RMS in (all) BPD patients. However, we only found significant associations between discrepancy and memory specificity in our depressed participants. Nevertheless, the non-depressed participants probably have some ideals or standards they try to attain as well. And given the high co-morbidity rates with depression in BPD, it is unlikely that none of the non-depressed participants had never been depressed before, even though we do not have precise data on the number of previous episodes of depression of our participants.

The SMS (Conway, 2005; Conway & Pleydell-Pearce, 2000; Conway et al., 2004), and the CaR-FA-X model (Williams et al., 2007), however, also take into account executive functioning and traumatic experiences. Depression and rumination are known to be associated with lower levels of executive functioning, which could explain why we only found a relation between discrepancy and memory specificity in our depressed participants. Furthermore, as mentioned before, depression in BPD patients could be different in nature since it can be considered in terms of affective instability following traumatic experiences, or as a post-traumatic symptom. Unfortunately no measures on (post-)trauma (symptoms) nor on executive functioning were administered.

An alternative, though speculative, possible explanation is delivered by Parker et al. (2006), who suggested that BPD patients differed in self-complexity. They assume that high self-complex persons will abandon to focus on discrepant ideal-self content, thereby protecting them to develop depression. We could therefore (tentatively) hypothesise that our currently depressed participants would be low in self-complexity,

therefore focussing more on ideal-actual discrepancies, which would lead to less specific memories. However, since this hypothesis is speculative, further research is necessary to test it.

Three topics need further discussion. First, we need to analyse the different findings concerning relevancy, which we found was unrelated to RMS, and discrepancy, that was highly associated with RMS in depressed participants. According to the SMS (Conway, 2005; Conway & Pleydell-Pearce, 2000; Conway et al., 2004) an emphasis on discrepancies (= highly discrepant) regarding personal (= highly relevant) goals could lead to a reallocation of the resources in the disadvantage of autobiographical memory specificity, suggesting that relevancy as well as discrepancy are both necessary elements in influencing memory specificity, and none of them is sufficient as such. Our data do confirm that relevancy as such is not sufficient, since it does not lead to problems in retrieving specific memories. Since high discrepancy indices are related to difficulties in retrieving specific autobiographical memories, we can conclude that discrepancy as such is a necessary factor in the correlation. However, it is not clear whether discrepancy is a sufficient factor, since our discrepancy indices are constructed by multiplying previously determined relevancy scores ('synonymy scores') by the discrepancy scores, thereby taking into account relevancy as well. This was a necessary step, because we needed to determine to what degree AMT cues and self-reported self-guides were related. In order to clearly distinguish between relevancy and discrepancy, pure discrepancy scores should be obtained in future research. This can be done by constructing personal AMT's, based on one's self-reported self-guides, or, the other way around, by asking participants to what degree they think they ought to have, ideally would like to have, or fear to have the characteristics expressed by the AMT cues, and to what degree they actually believe they possess each of these characteristics at the moment. Tentatively, we do believe that relevancy as well as discrepancy are necessary factors, since we think that highly discrepant domains are

not necessary highly relevant for the respondent, thereby having less impact on one's resources and thinking processes.

Second, it would be interesting to see whether memory specificity in (depressed) BPD patients depends on the sort of discrepancies they mainly report, given the fact that BPD patients often complain about disturbed mood and anxiety. Following the ideas of Higgins and co-workers (e.g., Higgins et al., 1985; 1986), we would expect that depressed BPD patients experience more discomfort following the confrontation with ideal self-guides, which would lead to less specific retrieved memories. Despite our small sample size, we conducted some preliminary analyses, using indices that only took into account the ought, the ideal, and the feared self-guides respectively. Stressing that a larger sample size is recommended for these analyses, our data suggest that, contrary to the expectations, discrepant ideas about one's ought self are more important in relation to RMS than discrepant or relevant ideas about any other kind of self, and only in the depressed subgroup of our sample. Further research has to be conducted, of course, but such data could also help pointing out whether rumination content (as stressed in the definition of rumination by Nolen-Hoeksema, 1991) or its process characteristics ("negative, uncontrollable and perseverative", as stated by Watkins, 2008), or both are influencing RMS.

Finally, it should be questioned why discrepancy scores were only related to depression severity in our depressed participants, but not in general. Again, no clear-cut explanations can be offered, although we could again assume that depression in BPD differs in nature from depression in MDD. It is conceivable that traumatic experiences in vulnerable subjects install a range of post-traumatic symptoms, including an increased attention to self-coherence and depressed state with associated (ruminative) information processes. The focus on self-coherence and the depressed state may be maintained by worry-like thoughts, considering how one should be or act, given the (disturbed) circumstances (ought discrepancies). All these processes use available executive resources which in turn are unavailable for guided search processes. Future

research should therefore also focus on post-trauma symptoms and executive functioning.

Our findings are not without limitations. As mentioned before, we did not collect information on the number of previous depressive episodes, (severity of) past traumatic experiences and post-traumatic stress. Furthermore, we failed to collect information about the medication use of our participants, as well as about their executive functioning. Future research should take these variables, of which is known that they could explain (additional) variance in memory specificity, into account in order to conduct more complete analyses.

Furthermore, we used a relatively small sample (n=34) and participants were included in our study based on a diagnosis made by the treating psychiatrist. No more valid and reliable procedures (e.g., SCID-I, SCID-II) were used, nor did we assess participants' precise borderline features or self-complexity. Therefore, we cannot exclude that our findings are the artefact of a selection bias in the pool of BPD phenotypes. Thus, replication with proper selection instruments in a larger sample is recommended.

In addition, although the (written) AMT we used has been successfully used in previous research (e.g., Henderson et al., 2002; Raes et al., 2008; 2009), and analogous results were found in comparable samples, we have to admit that no direct comparison with the standard (oral) AMT has been done so far. The version we used differs procedurally from the standard AMT (no time constraints, taking into account the respondent's own judgement regarding specificity or overgenerality, possible difficulties deriving the level of specificity from written answers that had no further comment), which may have influenced our measure of memory specificity, and therefore our results.

Further comments concern time span of data collection. AMT administration immediately followed SDQ administration. We cannot exclude that filling out the SDQ might have activated important schemas that could have affected memory retrieval during AMT administration. In future studies, self-guides should ideally be assessed at

least one week before running the AMT (Williams, personal communication, Berlin, October 1, 2009).

Finally, we need to be careful using the indices we created to test our hypotheses on the relations between self-relevance/self-discrepancy and memory specificity. Although a large sample of volunteers scored to what degree self-descriptions and AMT cues were synonymous, each volunteer only got a random selection of 67 matches, and each match was only scored by 4.11 volunteers on average. The raters were recruited using different ways (personal contacts of the first author, contacts of personal contacts, website advertisements on forums), which makes it harder to assess the homogeneity of this group. We did however include some descriptive variables, which show that the raters differ in many aspects from the participants. The raters had higher levels of education, were more often married and they usually were employed.

However, and notwithstanding the above limitations, the present results suggest that depression (in interaction with cue relevance) as well as depression severity play an important role in RMS in BPD patients, extending earlier observations by, for example, Kremers et al. (2004, 2006a), but contradicting other findings by Arntz et al. (2002), Jones et al. (1999), Kremers et al. (2004, 2006a), Maurex et al. (2010), Reid and Startup (2010), and Renneberg et al. (2005). Also, the findings concerning the importance of cue content are consistent with prior work in the field (e.g., Barnhofer et al., 2007; Crane et al., 2007; Spinhoven et al., 2007) and add to the preliminary evidence suggesting an important association between RMS and the extent to which cues activate highly (discrepant) personal domains, which fits with the influential SMS model on autobiographical memory by Conway and colleagues (Conway, 2005; Conway & Pleydell-Pearce, 2000; Conway et al., 2004). Nevertheless, we may have neglected to include potential important variables, such as history of trauma, data on the personal coping with or consequences of trauma, or measures of executive functioning that could account to a better understanding of RMS in BPD.

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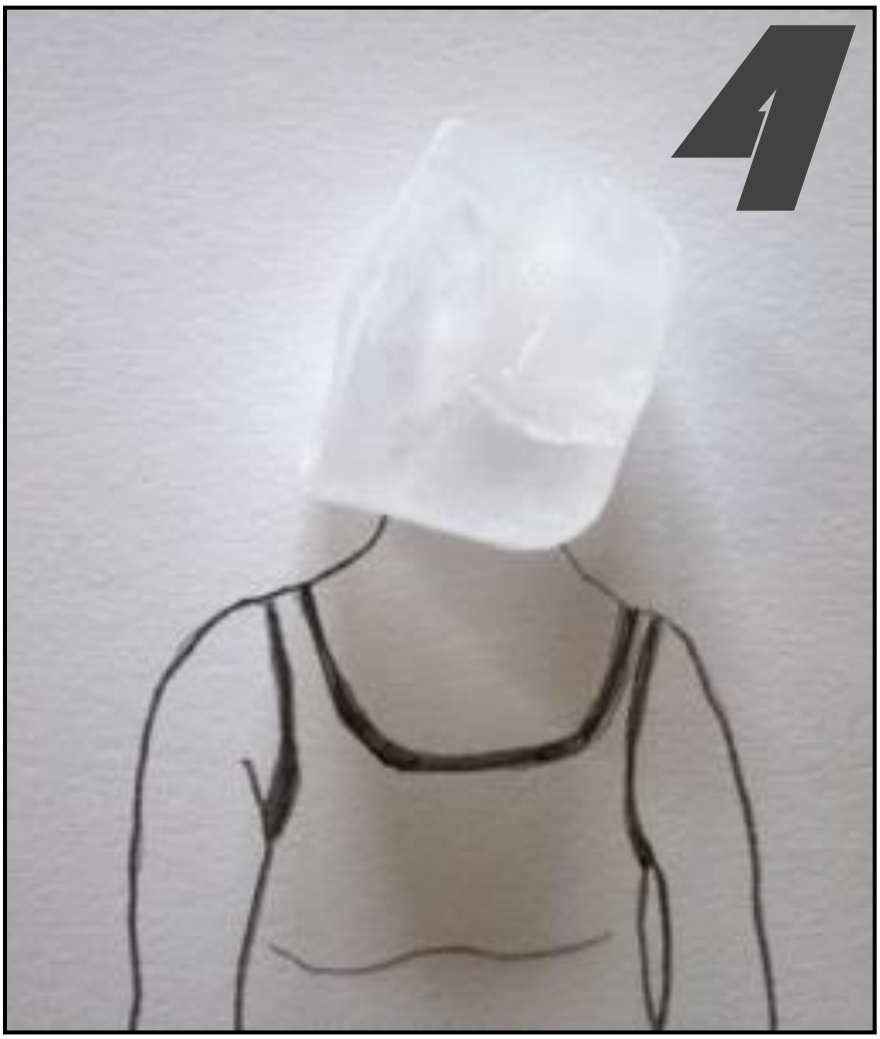

Specificity and Vantage Perspective: Associations with MDD, PTSD, and Self-Discrepancy in Borderline Patients

Adapted from:

Van den Broeck, K., Pieters, G., Claes, L., Berens, A., & Raes, F. (submitted). Specificity and vantage perspective during autobiographical memory retrieval: Associations with co-morbid depression, post-traumatic stress disorder, and self-discrepancy in borderline personality disorder.

ABSTRACT

Studies have shown that, compared to controls, patients suffering from Major Depressive Disorder (MDD) and Post-Traumatic Stress Disorder (PTSD) retrieve less specific memories ('overgeneral memory', OGM). Furthermore, these patients more often use an observer perspective (vs. field perspective) during autobiographical memory recall. Although patients with Borderline Personality Disorder (BPD) regularly report depressed mood and a traumatic history, OGM in BPD patients is only inconsistently found, and perspective during recall has not been studied in BPD before. We examined the relationship between MDD and PTSD status on the one hand, and specificity and vantage perspective of memory recall on the other hand, in BPD patients. Additionally, we explored whether prompting self-discrepancy would result in less specific, and more observer memories. Fifty-four BPD patients completed the Self-Description Questionnaire, the Structured Clinical Interview for DSM-IV Disorders, the standard Autobiographical Memory Test (AMT) and a personalised AMT that is believed to prompt self-discrepancy. Results showed that BPD patients with a co-morbid diagnosis of PTSD retrieve memories more from an observer perspective than those without PTSD. Our results suggest that traumatised (BPD) patients may benefit from therapeutic strategies that encourage the adoption of a field perspective during autobiographical memory retrieval.

INTRODUCTION

"Autobiographical memory is the aspect of memory that is concerned with the recollection of personally experienced past events" (Williams et al., 2007, p. 122). The study of autobiographical memory extends in different lines of research. The current chapter focuses on the association between specificity and vantage perspective during autobiographical memory retrieval on the one hand and co-morbid major depressive disorder (MDD; APA, 1994) and post-traumatic stress disorder (PTSD; APA, 1994) on the

other hand in patients with borderline personality disorder (BPD; APA, 1994). In addition, we explore the role of self-discrepancy in autobiographical memory retrieval.

Memory specificity is traditionally measured using the Autobiographical Memory Test (AMT; Williams & Broadbent, 1986). In the AMT, participants are presented with word cues, such as 'happy' or 'lazy', and are instructed to retrieve specific memories, i.e. memories referring to events that happened on a particular day and place (e.g., "That one time, when my ex-husband threatened me in front of the children on my 48th birthday.", in response to the cue 'afraid'). Several studies (see Williams et al., 2007, for a review) have shown that (remitted) depressed and traumatised patients, compared to controls, more frequently retrieve categories of events (e.g., "Each time he threatened me"). This phenomenon is referred to as overgeneral memory (OGM). One assumption is that OGM may prevent one to get overwhelmed by painful recollections (CaR-FA-X model, Williams et al., 2007; Self-Memory System, SMS, Conway, Singer, & Tagini, 2004). However, being overgeneral *all the time* is believed to be detrimental for a number of reasons. For instance, OGM has been shown to undermine successful problem solving (e.g., Evans, Williams, O'Loughlin, & Howells, 1992). Additionally, OGM has been found to be associated with higher levels of rumination (e.g., Raes, Watkins, Williams, & Hermans, 2008), a less favourable course of depression (see Sumner, Griffith, & Mineka, 2010, for a review), and a greater chance of PTSD in trauma survivors (Kleim & Ehlers, 2008). Finally, Conway and colleagues (Conway & Pleydell-Pearce, 2000; Conway et al., 2004) argue that specific memories are essential in the construction and maintenance of our self-concept.

Despite the fact that an unstable sense of self is a core feature of BPD ('identity disturbance'; APA, 1994), and that BPD patients often suffer from co-morbid MDD and PTSD (Grant et al., 2008), OGM is only inconsistently found in BPD patients (see Van den Broeck, Claes, Pieters, Hermans, & Raes, in press, for a review, or Chapter 2 in this thesis). Some studies suggest that OGM in BPD is at least in part associated with MDD (Arntz et al., 2002; Kremers et al., 2004; but see e.g., Maurex et al., 2010, for

contradictory findings). Previous studies further found no association between OGM and PTSD in BPD patients (Kremers et al., 2004; Renneberg et al., 2005). Therefore, the first aim of the present study was to further explore the associations between MDD/PTSD and OGM in BPD patients. Based on previous findings, we hypothesised that OGM in BPD patients would be associated with a co-morbid diagnosis of MDD (Hypothesis 1a), but not with co-morbid PTSD (Hypothesis 1b).

Besides level of specificity, another dimension of autobiographical memories that has attracted the attention of researchers is vantage perspective during memory recall. Most recollections are typically remembered from one's original viewpoint, as if one 'sees' the situation through one's own eyes (i.e., first person or field perspective; Bergouignan et al., 2008; Nigro & Neisser, 1983). However, some memories are remembered while 'seeing' the situation as an observer (i.e., third person, or observer perspective). Field memories are generally experienced as more emotional and detailed, whereas in observer mode one is more likely to focus on the objective circumstances than on the affective elements (Berntsen & Rubin, 2006; McIsaac & Eich, 2002; 2004). It has been suggested that traumatic memories are more often retrieved from an observer perspective (Berntsen, Willert, & Rubin, 2003; Kenny & Bryant, 2007), but higher proportions of observer memories – especially when retrieving positive memories – are also reported in samples of (remitted) depressed individuals (Bergouignan et al., 2008; Lemogne et al., 2006), independent of a trauma history or whether the memory referred to traumatic experiences or not (Kuyken & Howell, 2006). Three theories try to explain the elevated levels of observer memories in depressed and traumatised patients. First, the adoption of an observer perspective may help to regulate one's affect in response to distressing memories, because observer memories are likely to reduce memories' emotional arousal (e.g., Robinson & Swanson, 1993). However, the tendency to retrieve observer memories is an avoidant strategy (Kuyken & Moulds, 2009; Lemogne et al., 2009) that is only functional in the short term. In the long term, trauma-related observer memories predict PTSD symptom severity

(Kenny et al., 2009). Second, observer memories become more likely when one compares one's actual self with a former or future self (Libby & Eibach, 2002; Libby, Shaeffer, Eibach, & Slemmer, 2011). Comparison is an important element of rumination, which has an essential role in the maintenance and onset of depression (e.g., Nolen-Hoeksema, 2000) and PTSD (e.g., Ehring, Frank, & Ehlers, 2008). Finally, according to Libby and Eibach (2011) the perspective one adopts during recall depends on how one conceptualises the retrieved life event in relation to one's self-concept. Important life events that often precede MDD (e.g., Kessler, 1997) and/or PTSD, give rise to observer memories, because the individual needs them to be framed in a broader context, e.g., one's self-beliefs, or in relation to other significant life events. Field memories, on the other hand, evoke concrete features of a situation, and are therefore assumed to address the experiential self. According to this theory then, and opposed to the concept of perspective taking as an avoidance strategy (cf. first account), observer memories may even intensify emotional responses (Libby, Valenti, Pfent, & Eibach, 2011).

The second aim of this study was to further investigate vantage perspective in relation to MDD and PTSD in BPD patients. Most trauma-related studies on vantage perspective have focused on vantage for traumatic memories. However, in the light of the first two accounts (i.e., perspective as a function of avoidant affect-regulation or comparative processing), it is reasonable to expect that the adoption of an observer perspective may extend to non-traumatic memories as well, resulting in an *observer retrieval style*. More specifically, we hypothesised higher proportions of observer memories in (previously) depressed BPD patients compared to never depressed BPD patients (Hypothesis 2a), and in BPD patients with co-morbid PTSD compared to BPD patients without PTSD (Hypothesis 2b), irrespective of the content (trauma-related or not) of the memory.

The third and final aim of this study was to explore the impact of self-discrepancy on OGM and vantage perspective during recall. Recent findings indicate that memory specificity in (remitted) depressed patients may be influenced by the meaning AMT

cues have for each respondent (e.g., Crane, Barnhofer, & Williams, 2007). When a memory search process, for example in response to an AMT cue word, gives rise to the activation of information that is highly discrepant towards one's current self-concept, this is thought to jeopardise the stability of the actual self. Cognitive resources are then shifted away from current search processes, in order to prevent a disorganised self (Conway et al., 2004). The search process is aborted before the memory layers with detailed information are reached, which will result in a generic (categoric) memory. Indeed, Van den Broeck, Claes, Pieters, and Raes (2012 – see also Chapter 3 in this thesis) found that the greater the extent to which AMT cues refer to discrepant domains about the self, the less specific memories are retrieved in a sample of currently depressed BPD patients (see also Schoofs, Hermans, & Raes, 2012). To cover self-discrepancy in this study, we constructed a personalised AMT (pAMT) for each respondent, using his or her ten most self-discrepant self-guides. This pAMT was administered in addition to the standard AMT. With respect to OGM, we first hypothesised that, in line with previous findings, (remitted) depressed patients would show more OGM in response to the pAMT, compared to never depressed (BPD) patients (Hypothesis 3a). Second, although PTSD and OGM have been found to be unrelated in BPD patients (Kremers et al., 2004; Renneberg et al., 2005), we hypothesised that prompting self-discrepant (traumatic?) information in PTSD patients using the pAMT would hinder guided search processes, resulting in higher levels of OGM than in patients without PTSD (Hypothesis 3b). Finally, we hypothesised that the pAMT in general would result in higher levels of OGM than the standard AMT (Hypothesis 3c).

With respect to the relation between vantage perspective and self-discrepancy, we reasoned that prompting self-discrepancy would make idiosyncratic comparisons more likely. We therefore hypothesised that the pAMT would result in higher proportions of observer memories in patients with a history of depression (Hypothesis 3d) and in patients with PTSD (Hypothesis 3e), who are more prone to ruminative processes than

never depressed (e.g., Roberts, Gilboa, & Gotlib, 1998, study 1) and non-PTSD patients (e.g., Murray, Ehlers, & Mayou, 2002), respectively. Finally, we hypothesised that the use of the pAMT overall will result in higher proportions of observer memories than the standard AMT (Hypothesis 3f). To our knowledge, self-discrepancy has never been studied in relation to vantage perspective and trauma before. Therefore, most of these hypotheses (3b, 3d, 3e, and 3f) have an exploratory nature.

METHOD

PARTICIPANTS

Participants were 54 patients (8 males), all meeting DSM-IV BPD criteria (APA, 1994) according to the SCID-II interview (SCID-II; First, Gibbon, Spitzer, Williams, & Benjamin, 1997; Dutch translation by Weertman, Arntz, & Kerkhofs, 2000). All participants were between 18 and 51 years of age (M = 29.48, SD = 8.37). They were recruited in two Belgian psychiatric hospitals: University Psychiatric Centre KU Leuven, Campus Kortenberg (77.78%) and Psychiatric Hospital Duffel (22.22%). Most patients were inpatients (79.63%) staying at a general psychiatric ward (46.51%), at a specialised unit treating BPD according to the principles of Dialectical Behavioural Therapy (34.88%) or at a unit specialised in the treatment of anxiety disorders (18.60%). Eleven patients followed day treatment and outpatient emotional skills trainings, organised by the aforementioned hospitals. No differences were found between patients of different settings with respect to memory specificity nor vantage perspective, except for the number of specific memories retrieved in response to the personalised AMT (Sp), $M_{\text{Kortenberg}}$ = 7.33, M_{Duffel} = 8.58, F = 7.56, p < .01. Although only 22.22% of all patients were recruited in Duffel, 40.00% of the never depressed participants came from Duffel. Furthermore, inpatients did not differ from outpatients with respect to the variables of interest. We therefore decided to study the sample as a whole.

INSTRUMENTS

Structured Clinical Interview for DSM-IV Disorders, Axis II (SCID-II, First et al., 1997; Dutch translation by Weertman et al., 2000). The SCID-II is a semi-structured interview that assesses DSM-IV Axis II disorders (APA, 1994). All SCID-II interviews were performed by the first author, who is trained to use the SCID-II. The SCID-II items are scored as *not applicable*, *applicable but not sufficiently present*, or *present*. Scores reflect the presence or absence of 12 personality disorders (all DSM-IV personality disorders plus depressive and passive-aggressive personality disorder). Interrater reliability of the SCID-II ranges from .90 to .98 for dimensional judgements and internal consistency ranges from .71 to .94 (Maffei et al., 1997).

Structured Clinical Interview for DSM-IV Disorders, Axis I (SCID-I, First, Spitzer, Gibbon, & Williams, 1997; Dutch translation by van Groenestijn, Akkerhuis, Kupka, Schneider, & Nolen, 1999). This semi-structured interview was used to assess DSM-IV Axis I disorders (APA, 1994). We only administered the MDD and PTSD modules. Again, interviews were performed by the first author. For the module on MDD, satisfactory test-retest reliability (κ = .61) and interrater reliability (κ = .80) are reported (Zanarini et al., 2000). For the module on PTSD, satisfactory test-retest reliability (κ = .78) and interrater reliability (κ = .88) are reported (Zanarini et al., 2000).

Autobiographical Memory Test (AMT, Williams & Broadbent, 1986; Dutch version). In the AMT, respondents are presented with 18 cues that are read aloud by the experimenter (*happy, sad, safe, angry, interested, clumsy, successful, emotionally hurt, surprised, lonely, relaxed, guilty, proud, afraid, pleasant, cowardly, carefree,* and *lazy*). Participants are invited to retrieve specific memories. The definition of a specific memory is explained by means of an example. Three example cues are presented before the actual task to check whether the participants understood the instructions. Answers were immediately coded as 'specific', 'general categoric' (if the response refers to a category of events), 'general extended' (if the answer refers to an event that took longer than one day), 'no memory' (e.g., a semantic association), or 'same event'

(whenever the retrieved memory was identical to a memory retrieved in response to a previous cue). If respondents first retrieved a general memory or a memory that had been retrieved before, they were prompted to search for a (different) specific memory. If no memory was reported within 60 seconds, the next cue was presented and the answer was coded as 'omission'. Originally, we were only interested in memory specificity. We thus computed the number of categoric (GC) and specific memories (S) retrieved and, to correct for the number of omissions, the proportions[12] of specific [%S = S / (18 – number of omissions)] and general categoric memories [%GC = GC / (18 – number of omissions)]. Vantage perspective was included at a later stage. We therefore extended the protocol in the following way: At the end of the AMT, the experimenter explained the difference between field and observer perspective using a standardised instruction. Subsequently, participants were asked to classify each memory they retrieved as a field or an observer memory. Because Kuyken and Moulds (2009) argue that coding vantage perspective of semantic associations, categoric, and extended memories cannot be readily done, we only took the perspectives for the specific memories into account. Participants were unable to code three specific memories (out of a total of 496 specific memories retrieved since measuring vantage perspective) for vantage perspective. For each participant, the proportion of observer memories was calculated [%O = number of observer memories / (number of field memories + number of observer memories)]. AMT administrations were audiotaped. A random sample of ten percent of all answers to AMT cues were re-coded by a second rater, judging memory specificity. Interrater agreement was found to be high, κ = .82.

[12] To preserve maximum readability, we do not report the results for our proportional indices of specific (%S and %Sp) and categoric (%GC and %GCp) memories, unless they are different from the results using the plain number of specific (S or Sp) and categoric (GC or GCp) memories.

Self-Description Questionnaire (SDQ, Crane et al., 2007; non-published Dutch adaptation by Van den Broeck, Claes, & Raes, 2008). The SDQ, originally developed by Higgins, Klein, and Strauman (1985) to measure the actual, ideal and ought selves (see Appendix A, p. 235, for definition), has been adapted several times (Carver, Lawrence, & Scheier, 1999; Crane et al., 2007; Strauman, 1992; Van den Broeck et al., 2008). We used the same version as Van den Broeck et al. (2012 – Chapter 3 of this thesis). First, participants were asked to describe their actual self by means of seven characteristics. For each of the actual self-descriptions participants reported, they had to fill out a 100 mm visual analogue scale (VAS), measuring the extent to which respondents believe they *actually* possess the cited characteristic *at the present moment*. These data were not used. Afterwards, participants were asked to describe their ought, ideal and feared selves, again by means of seven characteristics for each self. For each of the 21 produced self-guides, two VASs were presented. On the first VAS, respondents were asked to indicate to what degree they ought to have, ideally would like to have or feared to have the self-guides they had written down, depending on whether the self-guide belonged to their ought, ideal or feared self respectively. As for attributes formulated as characterising the actual self, participants were asked to indicate on the second VAS to what degree they actually possessed each of the cited self-guides at the present moment. This procedure allowed us to calculate discrepancy scores for each self-guide by subtracting the position on the second scale from the score on the first scale.

Personalised Autobiographical Memory Test (pAMT). For each participant, the ten most discrepant self-guides as formulated in the SDQ were selected, and given back to the participant in a random order. Instructions and scoring is identical to that of the standard AMT, for both memory specificity and vantage perspective. We computed the number of specific (Sp) and categoric memories (GCp), and the proportion of observer memories (%Op). Participants were unable to code four specific memories (out of a total of 269 retrieved specific memories since the measurement of vantage

perspective) for vantage perspective. Also, as for the standard AMT, overall interrater agreement for memory specificity was satisfactorily high, κ = .78[13], based on a random sample of ten percent of the answers given in response to pAMT cues.

PROCEDURE

This study was part of a larger study investigating autobiographical memory in BPD psychopathology. Following oral and written informed consent, participants were asked to fill out a battery of tests and questionnaires, of which the first was the SDQ. Afterwards, the SCID-I modules, the SCID-II and the standard AMT were administered, in this order. Due to practical issues, data collection often took more than one session, but in general a respondent's protocol was completed within a three week timespan. To avoid memory effects, and to prevent that participants would associate the pAMT with the SDQ, the pAMT was administered at the end of the protocol.

RESULTS

DESCRIPTIVE STATISTICS

Table 7 presents the sample characteristics for the total group, as well as for the subsample (n = 34) of which data on vantage perspective during recall are also available. Most of the participants (70.37% in the total sample, 67.65% in the vantage perspective subsample) met more than five criteria needed for a BPD diagnosis (*M* = 6.39; *SD* = 1.17 in the total sample; *M* = 6.32; *SD* = 1.19 in the subsample). Additionally, the majority of participants (66.67% of the total sample; 64.71% of the subsample) had one or more co-morbid Axis II disorders (*M* = 1.26 in the total sample; *M* = 1.15 in the

[13] We would like to thank David Stuers for his contributions in calculating interrater reliability of the (p)AMT output (in this Chapter, buth also in Chapters 6 and 7).

subsample; both ranging from 0 to 4). The following Axis II disorders were most often diagnosed besides BPD in the total and subsample, respectively: Obsessive-Compulsive (25.93%; 23.53%), Paranoid (24.07%; 23.53%), Antisocial (24.07%; 20.59%), and Narcissistic (20.37%; 23.53%) personality disorder.

Table 7 Sample characteristics for the total sample (n = 54) and for the subsample of which data on vantage perspective are available (n = 34)

	Total sample (n = 54; 8 males)	**Subsample (n = 34; 6 males)**
Age (M, SD)	29.48 (8.37)	29.82 (8.75)
Education level (%)		
Primary school	9.3	14.7
High school	53.7	55.9
College	25.9	14.7
University	11.1	14.7
Civil state (%)		
Single	63.0	64.7
Living together	26.0	20.6
Married	3.7	2.9
Divorced	7.4	11.8
Occupation (%)		
Student	9.3	8.8
Unemployed	38.9	29.4
Working / on sick leave	48.1	55.9
Other	3.7	5.9
N Kortenberg/N Duffel	42 / 12	22 / 12
N Inpatient/N outpatient	43 / 11	23 / 11
Inpatient (%) at		
General psychiatric ward	46.5	60.9
Specialised DBT unit	34.9	26.1
Specialised anxiety unit	18.6	13.0

Table 8 Presence and absence of MDD and PTSD in our sample

	Currently depressed	Remitted depressed	Never depressed	Total
Current PTSD	12 (7)	7 (3)	0 (0)	19 (10)
No PTSD	6 (4)	19 (10)	10 (10)	35 (24)
Total	18 (11)	26 (13)	10 (10)	54 (34)

Numbers in parentheses refer to the subsample of which data on vantage perspective during recall are available (n = 34)

Presence or absence of MDD and PTSD in the total and subsample is presented in Table 8. In sum, patients of the subsample in whom we investigated vantage perspective are similar to the total sample.

THE RELATIONSHIP BETWEEN OGM AND MDD/PTSD (HYPOTHESES 1A-B)

Table 9 presents the number of specific and categoric memories, retrieved in response to the standard AMT (S and GC) and the personalised AMT (Sp and GCp), in function of co-morbid diagnoses of MDD and PTSD. To test the hypothesis that a co-morbid diagnosis of MDD would be related with OGM (Hypothesis 1a), an ANOVA[14] was conducted, comparing S and GC in currently depressed (n = 18), remitted depressed (n = 26) and never depressed (n = 10) participants. Levene's test indicated unequal

[14] Because we found age to be correlated with S, r = -.36, and GC, r = .34, both ps < .05, we initially conducted an ANCOVA with age as covariant. However, Levene's test indicated unequal variances between groups for S, F = 5.06, and for GC, F = 5.22, both ps ≤ .01. We examined different transformations (x**.05/1/2, ln+1), but Levene's test remained significant. We then performed an ANOVA to test whether age differed in current, remitted, and never depressed. No association was found, F = 1.50, p = .232. We therefore concluded to conduct plain ANOVAs, not taking into account age as a covariate, when investigating the association between MDD/PTSD on the one hand, and S and GC on the other hand.

variances between groups for S, F = 3.41, and GC, F = 3.54, both ps < .05. Therefore, degrees of freedom were adjusted from 51 to 30 and 20 respectively. Contrary to our expectations, we found no support for an effect of depressed status on memory specificity, *Welch's* F(2, 30.29) = 1.80, *Welch's* F(2, 20.13) = 1.91, both ps ≥ .174 and both ωs ≤ .19, for S and GC, respectively.

Table 9 Overgeneral memory in function of a diagnosis of MDD/PTSD in the total sample of BPD patients (n = 54)

	Current depressed (n = 18)		Remitted depressed (n = 26)		Never depressed (n = 10)		Current PTSD (n = 19)		No PTSD (n = 35)	
Standard AMT										
S	13.78	(3.00)	14.88	(2.18)	15.30	(1.16)	14.47	(2.12)	14.66	(2.55)
GC	1.33	(1.64)	.65	(.69)	1.10	(.99)	.95	(.85)	.97	(1.32)
Personalised AMT										
S	$7.78^{a,b}$	(1.31)	7.15^{a}	(1.59)	8.50^{b}	(.97)	7.47	(1.71)	7.69	(1.35)
GC	$.50^{a}$	(.51)	$.12^{b}$	(.33)	$.30^{a,b}$	(.48)	.32	(.48)	.26	(.44)

S = number of specific memories; GC = number of categoric memories. Different letters in a row mark significant differences following Tukey post-hoc comparisons, p < .05.

We further tested whether BPD patients with co-morbid PTSD (n = 19) showed more OGM compared to BPD patients without PTSD (n = 35) on the standard AMT (Hypothesis 1b). As expected, both groups did not differ significantly with respect to S and GC, F = .07, and F = .01, respectively, both ps ≥ .791 and both ds ≤ .08.

The relationship between vantage perspective during recall and MDD/PTSD (Hypotheses 2a-b)

Table 10 presents the proportion of observer memories, retrieved in response to the standard AMT (%O) and the personalised AMT (%Op), in function of co-morbid

diagnoses of MDD and PTSD. First, we hypothesised that (previously) depressed patients would recall higher proportions of observer memories compared to never depressed participants (Hypothesis 2a). However, an ANOVA comparing %O in currently depressed (n = 11), remitted depressed (n = 13) and never depressed (n = 10) participants, did not support this hypothesis, $F(2, 31) = .90$, $p = .417$, $\omega = .07$.

Table 10 Vantage perspective during recall in function of a diagnosis of MDD/PTSD in BPD patients (n = 34)

	Current depressed (n = 11)		Remitted depressed (n = 13)		Never depressed (n = 10)		Current PTSD (n = 10)		No PTSD (n = 24)	
Standard AMT	.47	(.23)	.51	(.14)	.41	(.19)	.57[a]	(.16)	.43[b]	(.18)
Personalised AMT	.53	(.18)	.52	(.21)	.38	(.26)	.57	(.17)	.44	(.23)

Means in this table represent the proportion of observer memories retrieved, i.e., number of observer memories / (number of field memories + number of observer memories).

Different letters in a row mark significant differences, $p < .05$.

Likewise, we hypothesised that patients with PTSD would retrieve higher %O compared to patients without PTSD, irrespective of memory content (Hypothesis 2b). Only 11 of the 493 memories scored for vantage perspective directly referred to the traumatic experiences listed during SCID-I administration. In line with our expectation, we found that participants with PTSD (n = 10) retrieved significantly higher %O than participants without PTSD (n = 24), $F = 4.42$, $p < .05$, and $d = .82$.

The impact of self-discrepancy on OGM/vantage perspective, in relation to MDD/PTSD (Hypotheses 3a–f)

With respect to the personalised AMT (pAMT), we hypothesised that current and remitted depressed BPD patients would show more OGM compared to never depressed

participants (Hypothesis 3a; Table 9). We performed an ANOVA, comparing Sp and GCp in currently depressed, remitted depressed, and never depressed participants. Levene's test indicated unequal variances between groups for GCp, $F = 13.43$, $p < .001$. We found support for an effect of depressed status on Sp and GCp, $F(2, 51) = 3.49$, $\omega = .29$, and *Welch's* $F(2, 20.78) = 4.00$, $\omega = .33$, both ps $< .05$, respectively[15]. Post-hoc Tukey tests, however, revealed that remitted depressed patients retrieved fewer Sp than never depressed patients, but did not differ significantly from currently depressed patients[16]. Furthermore, post-hoc Games-Howell tests revealed that remitted depressed patients retrieved fewer GCp than currently depressed patients, but they did not differ from never depressed patients.

We further hypothesised that pAMT administration would result in more OGM in traumatised patients compared to non-traumatised patients (Hypothesis 3b). However, these groups did not differ from each other with respect to Sp and GCp, $F = .25$, $d = .14$, and $F = 20$, $d = .13$, both ps $\geq .618$.

We finally hypothesised that levels of OGM would be higher in response to the pAMT than to the standard AMT (Hypothesis 3c). To control for the different number of cues (n = 18 for the standard AMT, and n = 10 for the pAMT), we conducted pairwise comparisons, comparing %S and %Sp, as well as %GC and %GCp. Contrary to our predictions, we found that pAMT cues elicited less categoric memories than standard AMT cues, $M_{AMT} = .06$, $M_{pAMT} = .03$, $t(53) = 2.66$, $p = .010$, and $d = .73$. No differences were found between %S and %Sp, $M_{AMT} = .86$, $M_{pAMT} = .89$, $t(53) = 1.83$, $p = .073$, and $d = .50$. We further compared the proportion of omissions (%Omissions = number of omissions / the number of cues) for both AMTs. The pAMT resulted in nearly twice as

[15] %Sp and %GCp were only marginally significantly associated with depressed state, $F = 2.83$, $p = .068$, $\omega = .25$, and *Welch's* $F(2, 21.75) = 3.30$, $p = .056$, $\omega = .29$, respectively.

[16] These findings were not replicated with %Sp.

many omissions compared to the standard AMT, M_{AMT} = .06, M_{pAMT} = .11, $t(53) = 3.58$, p = .001, and d = .98.

With respect to vantage perspective, we hypothesised that current or remitted depressed BPD patients would show higher proportions of observer memories compared to never depressed participants in response to the pAMT cues (Hypothesis 3d; Table 10). We found no support for an effect of depressed status on vantage perspective during retrieval, $F(2, 31) = 1.52$, p = .235, ω = .17.

Furthermore, we hypothesised that trauma would be related with higher %Op (Hypothesis 3e). Results did not support this hypothesis, F = 2.40, p = .131, although d = .62.

Finally, we hypothesised that the use of the pAMT would result in higher %O than the standard AMT (Hypothesis 3f). However, %O and %Op did not differ from each other, M_{AMT} = .47, M_{pAMT} = .48, $t(33) = -.34$, p = .733, d = -.12.

DISCUSSION

We aimed to investigate the associations between diagnostic status (MDD/PTSD) on the one hand, and OGM and vantage perspective during recall on the other hand, in a sample of BPD patients. We further explored the impact of self-discrepancy on OGM and vantage perspective in relation to MDD and PTSD. The findings with respect to OGM, vantage perspective, and self-discrepancy will consecutively be discussed.

With respect to OGM, we found no effect of depressive state of BPD patients on standard AMT performance (Hypothesis 1a). This matches some previous findings (e.g., Renneberg et al., 2005), but contradicts others (e.g., Kremers et al., 2004), suggesting that MDD and OGM in BPD are not unrelated. It has been suggested that OGM is more strongly associated with suicidality (Maurex et al., 2010), hopelessness following intrusions (Renneberg et al., 2005), or differences in IQ and years of education (Reid & Startup, 2010), than with depression as such. Renneberg et al. (2005) further suggested

that (even depressed) BPD patients do not display 'mnemonic interlock'[17], or that they might be more motivated than patients with (only) MDD to meet the test instructions. We too have argued elsewhere that depression in BPD may differ in nature from depression in MDD (Van den Broeck et al., 2012 – Chapter 3 in this thesis). Depression in BPD should possibly be considered in terms of affective instability.

Furthermore, and in line with our hypothesis, we found that PTSD and memory specificity were unrelated in BPD patients when the standard AMT was used (Hypothesis 1b). This matches the results of all previous studies that investigated the association between OGM and PTSD in BPD patients (Kremers et al., 2004; Maurex et al., 2010; Renneberg et al., 2005), but strongly contradicts the finding that non-BPD patients with PTSD are generally less specific than non-BPD patients without PTSD (Moore & Zoellner, 2007). Taken together, these findings suggest that OGM does not serve affect-regulation in BPD patients as it does in patients with MDD and PTSD (see also Van den Broeck, Claes, Pieters, Berens, & Raes, submitted – Chapter 7 in this thesis). According to Conway and colleagues (Conway et al., 2004), highly self-discrepant (traumatic) information may threaten the stability of the self. Resources are then re-allocated towards processes that stabilise the self, away from other processes that are in need of resources. Guided search processes are aborted prematurely, resulting in OGM. In BPD patients, who are characterised by a chronic instable sense of self (APA, 2013), the reallocation towards self-stabilising processes may be disregarded, leaving sufficient resources to fulfil the search processes until specific memories are

[17] According to models on autobiographical memory organisation, autobiographical memories are hierarchically organised, with lower levels containing more event-specific knowledge. Guided search processes generally start off with a self-referent description of what has to be searched for at an intermediate level. With 'mnemonic interlock', Williams (1996) refers to processes that elaborate on the description, thereby continuously activating other self-descriptions and inhibiting to proceed down to more specific levels.

retrieved. Alternatively, the null findings with respect to OGM in BPD patients may be due to cognitive inhibitory dysfunctions, shown by BPD patients (e.g., Domes et al., 2006).

With respect to vantage perspective during recall, it should be noted that the proportion of observer memories (%O; %Op) retrieved in our sample is relatively high. Irrespective of the content of the memories, 46.92% and 48.18% of the specific memories in response to the standard AMT and pAMT respectively, were coded as observer memories, whereas other studies in trauma survivors (Kenny & Bryant, 2007), recurrent depressed adults (Kuyken & Moulds, 2009), and adolescents with and without MDD and/or PTSD (Kuyken & Howell, 2006) report 20% to 36% observer memories. Taking into account only traumatic memories of PTSD patients, McIsaac and Eich (2004) found that 36.73% of these memories were observer memories. In response to the standard AMT, our respondents retrieved only 11 memories (out of 496 coded for vantage perspective) that directly referred to one of the traumatic experiences mentioned during the administration of the SCID-I module on PTSD. Eight of these memories (72.72%) were retrieved while adopting an observer perspective. These findings may suggest that BPD patients in general more often adopt an observer perspective compared to other clinical (Kenny & Bryant, 2007; Kuyken & Moulds, 2009) and non-clinical groups (Kuyken & Howell, 2006). Yet, replication is necessary because, to our knowledge, we are the first to study vantage perspective during recall in BPD patients.

This said, we found that a depressed state was unrelated to perspective taking during retrieval in BPD patients (Hypothesis 2b). Our results contradict earlier findings on the association between depressive state and vantage perspective during recall in non-BPD respondents (e.g., Bergouignan et al., 2008; Lemogne et al., 2006). These findings may also reflect the different nature of depression in BPD compared to depression in MDD.

A co-morbid diagnosis of PTSD, on the other hand, resulted in higher proportions of observer memories in response to the standard AMT (Hypothesis 2b). This is in line with

clinical observations and earlier findings in students (Berntsen, Willert, & Rubin, 2003; Porter & Birt, 2001) and trauma-survivors (Kenny et al., 2009), who show more observer memories when recalling traumatic events. In addition, Kenny et al. (2009) showed that trauma-related observer retrieval predict PTSD symptom severity at 1-year follow-up. As stated above, our BPD patients already report relatively high proportions of observer memories. Nevertheless, our findings suggest that a co-morbid diagnosis of PTSD may result in more observer memories, irrespective of the content of the memories. This may be supportive for the idea of an observer memory retrieval style in PTSD patients (with BPD). In addition to the fact that the majority of PTSD-related memories were retrieved while adopting an observer perspective, these findings may indicate that vantage perspective during recall in PTSD serves the regulation of emotional distress or comparative processes. Unfortunately, we did not ask participants to rate their memories on valence and emotionality, which would have allowed us to test whether the idiosyncratic meaning of the event is related to the adopted perspective during recall. Further studies could therefore incorporate measures on memory valence and emotionality in order to investigate the framework proposed by Libby and Eibach (2011).

With respect to self-discrepancy, we found no support for any of the hypotheses. We first predicted that prompting self-discrepant information would result in higher levels of OGM, especially in (remitted) depressed participants (Hypothesis 3a). Our current depressed BPD participants, however, did not differ with respect to memory specificity (Sp and GCp) measured with the pAMT from the never depressed. To our knowledge, only Wessel et al. (2013) used idiosyncratic AMTs as well. They found similar results comparing previously and never depressed women that went through a complicated pregnancy. Yet, Van den Broeck et al. (2012 – Chapter 3) found that self-discrepancy was negatively associated with memory specificity in depressed BPD patients. They did not use pAMTs, but computed an index expressing the extent to which the (standard)

AMT cues were self-discrepant. Perhaps pAMTs are not sufficiently valid to measure self-discrepancy and/or its relations with depression.

Also contradicting our expectations, the pAMT was found to elicit less categoric memories than the standard AMT (Hypothesis 3c). However, pAMT administration resulted in twice as many omissions than standard AMT administration. Perhaps the explicit instructions to recall specific memories lead respondents not to verbalise a general memory in case they fail to retrieve a specific one. Such a trial, however, is scored as an omission. Alternatively, omissions may reflect the nature of discrepant selves: It is probably more difficult to retrieve genuine specific memories referring to situations that one has only seldom experienced.

All other hypotheses were exploratory. First, self-discrepant cues did not elicit more OGM in PTSD patients (with BPD) as compared to patients without PTSD (Hypothesis 3b). We expected that prompting self-discrepancy would reactivate the discrepancy between one's actual (damaged) self and one's other (ideal, ought, feared) selves. Available resources would then serve self-coherence, leaving insufficient means to successfully retrieve specific memories. Future studies should more closely investigate the impact of trauma on one's selves. Perhaps, the discrepant selves of a PTSD patient strongly resemble a former 'current self', making it easy to retrieve specific memories when prompted. Indeed, PTSD patients tend to incorporate the trauma in their current self (Sutherland & Bryant, 2005), making it a self-defining memory.

Furthermore, when prompting self-discrepancy, no significant association between MDD/PTSD and vantage perspective during recall was found (Hypotheses 3d and 3e). Finally, standard AMT and pAMT resulted in equal proportions of observer memories in our BPD patients, irrespective of a co-morbid MDD or PTSD diagnosis (Hypothesis 3f). However, other studies on the association between vantage perspective and self-discrepancy are lacking, and the validity of the pAMT may be questionable. Therefore, interpreting these findings is difficult. Perhaps, the association between vantage

perspective and self-discrepancy is non-existent. Alternatively, these null-findings may be specific for BPD patients, who are known to have an instable sense of self.

We should be careful to generalise our findings with respect to OGM and vantage perspective in depressed and traumatised BPD patients to individuals with MDD and PTSD without BPD. As described above, OGM in depressed and traumatised patients with BPD differs from OGM in depressed and traumatised patients without BPD. In addition, we previously argued (Van den Broeck et al., 2012 – Chapter 3) that depressed state in BPD may differ from MDD. Nevertheless, these findings may have important theoretical implications for non-BPD patients as well. Current theoretical models suggest that both OGM and the adoption of an observer vantage point during recall would serve functional avoidance (FA in CaR-FA-X; SMS), or that they would increase when (abstract) rumination, comparison-based processing are stimulated (CaR in CaR-FA-X). Our findings suggest that both strategies probably do not function interchangeably to regulate affect. More specifically, our results suggest that trauma (in BPD) gives rise to imagery adaptations (vantage perspective) during recall, and not to verbally based avoidance strategies (OGM), whereas depression in BPD is unrelated with OGM or the adoption of an observer perspective during autobiographical memory retrieval. Our results further suggest that the tendency to retrieve traumatic memories while adopting an observer perspective further generalises towards other kinds of memories in PTSD patients. It should be noted, however, that these conclusions are based on findings in a (limited) sample of BPD patients, who differ from non-BPD individuals on, e.g., hypervigilance. Therefore, emotional reactivity may also be important to take into account when attempting to explain these autobiographical memory disturbances in emotional disorders.

These results may also add to better treatment of PTSD (in patients with BPD). Indeed, several studies indicate that it is important that patients relive their traumatic experiences, in a way that the related emotions are reactivated (e.g., Hackmann, Bennett-Levy, & Holmes, 2011). Thus, it is recommended to retrieve memories from a

field perspective, rather than from an observer perspective. Additionally, our findings suggest that traumatised BPD patients acquire an observer retrieval style, resulting in more experiential avoidance in general. Therefore, we believe that traumatised patients may benefit from a therapeutic approach that encourages them to adopt a field perspective when retrieving memories *in general*, irrespective of their contents.

This study also has some limitations. First of all, given the heterogeneity of BPD, our sample size can be considered modest, especially because we divided it into several subsamples that we compared with each other. Furthermore, we did not present both AMT versions counterbalanced, and we used a dichotomous scale to measure vantage perspective. According to Rice and Rubin (2009), field and observer perspective are better measured with two distinct scales. Nevertheless, we are convinced that studying autobiographical memory in BPD patients could further elucidate the associations between autobiographical memory characteristics as OGM and vantage point during retrieval and associated psychiatric diagnosis or features. Further research may therefore not only address the above mentioned shortcomings, but should also include clinical and non-clinical non-BPD control groups.

Another important limitation, especially in combination with the sample sizes of the subgroups used, is that we conducted a relatively large number of analyses. This obviously increases the risk of Type I errors (false positives). As such, and also in view of the fairly large amount of null-findings, the one positive finding on (observer) perspective in our (traumatised) BPD-patients – although in line with existing findings in non-BPD samples – needs to be interpreted with caution.

Notwithstanding these limitations, this study is the first to investigate vantage perspective in BPD patients. Our findings suggest that BPD patients adopt an observer perspective during autobiographical memory retrieval relatively often, and that traumatised BPD patients have an observer memory retrieval style, often adopting an observer perspective for non-traumatic memories as well. We found no support for associations between depressed/traumatic state and an overgeneral memory retrieval

style in these patients. Our results suggest that traumatised (BPD) patients may benefit from therapeutic strategies that encourage the adoption of a field perspective during autobiographical memory retrieval.

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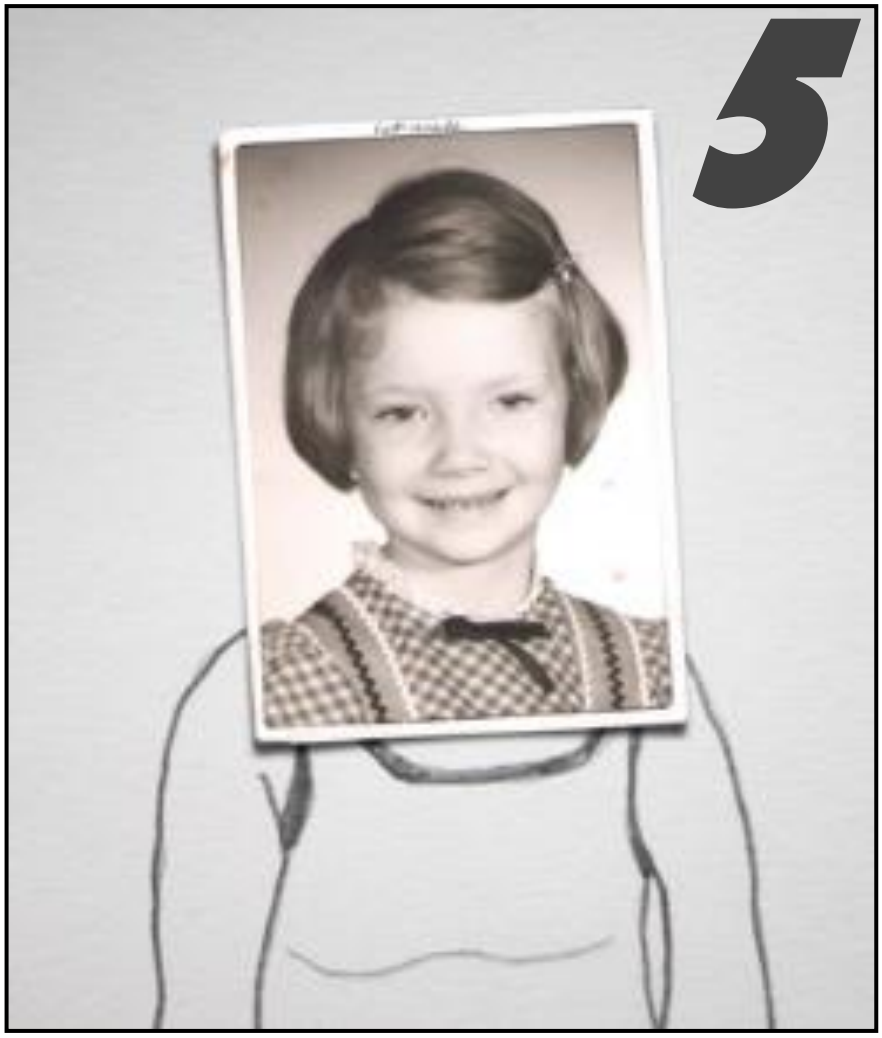

The Relation between Borderline Symptoms and Vantage Perspective during Memory Retrieval

Adapted from:

Van den Broeck, K., Reza, J., Nelis, S., Claes, L., Pieters, G., & Raes, F. (2014). The relationship between borderline symptoms and vantage perspective during autobiographical memory retrieval in a community sample. *Borderline Personality Disorder and Emotion Dysregulation, 1*:8.

ABSTRACT

Recent findings show that (previously) depressed and traumatised patients, compared to controls, more frequently use of an observer perspective (as set against a field perspective) when retrieving memories. Because patients with borderline personality disorder (BPD) often report mood disturbances and past traumatic experiences, it would be plausible to expect that these patients too would retrieve higher proportions of observer memories. Therefore, and given the phenotypical variance of BPD, we examined whether vantage perspective during recall is associated with one or more BPD symptom clusters. A community sample consisting of 148 volunteers (66 males) completed the Autobiographical Memory Test, the Borderline Syndrome Index, and the Depression Scale of the Depression Anxiety Stress Scales. Interpersonal and anxious-neurotic BPD features were found to be associated with higher proportions of observer memories. Contrary to our expectations, the proportion of observer memories was not associated with the total number of BPD symptoms. Nevertheless, our data suggest the existence of substantial connections between perspective taking during recall on the one hand and interpersonal difficulties and anxious-neurotic symptoms on the other hand, especially following cues that tap into domains that are highly discrepant towards one's actual self-concept.

BACKGROUND

"Autobiographical memory (AM) is the aspect of memory that is concerned with the recollection of personally experienced past events" (Williams et al., 2007, p. 122). It is believed to function as a kind of database of previous experiences on which we rely to find problem solving strategies when we experience difficulties (Sutherland & Bryant, 2008), and it is thought to play an important role in the construction of our self-concept and in goal oriented behaviour (Conway, 2005). It should not surprise, therefore, that problems with AM are found to be associated with emotional difficulties as major

depressive disorder (MDD; APA, 1994) and post-traumatic stress disorder (PTSD; APA, 1994). Recent findings (Berntsen, Willert, & Rubin, 2003; Kuyken & Howell, 2006) reveal that depressed and traumatised patients differ from healthy controls with respect to the perspective they adopt while retrieving memories. Patients diagnosed with borderline personality disorder (BPD) frequently complain about depressive episodes and they often report past traumatic experiences (Zanarini, Frankenburg, Hennen, Reich, & Silk, 2004). Hence, it is reasonable to assume that people high on BPD complaints would show similar AM disturbances as depressed and traumatised patients. To our knowledge, vantage perspective has not been studied in relation to BPD symptoms hitherto. In this chapter, we study the relationship between vantage perspective during retrieval and borderline complaints as measured in a community sample.

In general, most recollections are spontaneously remembered from one's original point of view, as if one again 'sees' the situation through one's own eyes (i.e., field perspective; Nigro & Neisser, 1983). Nevertheless, some memories are remembered while 'seeing' the situation as an observer might have seen it, also seeing oneself act in the situation (i.e., observer perspective or 'fly on the wall' perspective). Field memories are generally experienced as more emotional and detailed, whereas in observer mode one is more likely to focus on the objective circumstances than on the affective elements (Berntsen & Rubin, 2006; McIsaac & Eich, 2002; 2004; Robinson & Swanson, 1993) – but see also Libby and Eibach (2011) for less straightforward findings and interpretations. Traumatised and (formerly) depressed patients tend to retrieve larger proportions of observer memories compared to controls (in traumatised patients: e.g., Berntsen & Rubin, 2006; in currently depressed patients: e.g., Kuyken & Moulds, 2009; in previously depressed patients: e.g., Bergouignan et al., 2008).

According to Kuyken and Moulds (2009), there are at least two possibly compatible accounts that give rise to higher proportions of observer memories in depressed and traumatised patients. First, Kuyken and Moulds (2009) suggest that observer memories

are used when one evaluates oneself, or when one needs to compare the actual self with a former or future self (Libby & Eibach, 2002; Libby, Shaeffer, Eibach, & Slemmer, 2007). Disappointments about goals that have not been attained and discrepancies between one's actual self and one's ideal self may lead to dejecting schemas about the self (Higgins, Bond, Klein, & Strauman, 1986). Such schemas may threaten the stability of the self. In order to prevent a reactive crash of the self, the Working Self, which is responsible for maintaining an integrated sense of self (Conway, 2005; Conway & Pleydell-Pearce, 2000; Conway, Singer, & Tagini, 2004), specifically searches for information that is in line with the initial thoughts about the self. Hence, the organism is driven to evaluate oneself over and over, thereby using observer memories repeatedly. As expected, Kuyken and Moulds (2009) found positive correlations between the number of observer memories on the one hand and levels of self-evaluation on the other (also see Nelis, Debeer, Holmes, & Raes, 2013).

Second, following McIsaac and Eich (2004), Kuyken and Moulds (2009) suggest that the recollection of more observer memories may function as a cognitive functional avoidance strategy: The adoption of an observer perspective then, at least on the short term, prevents one from getting overwhelmed by intense and possibly painful emotions associated with intrusive memories that are common in depression and PTSD. Indeed, both clinical observations and research data (Berntsen et al., 2003; D'Argembeau & Van der Linden, 2004; McIsaac & Eich, 2004; Wilson & Ross, 2003) show that PTSD patients tend to report about their traumatic experiences while adopting an observer perspective, suggesting that the observer perspective may be adaptive in regulating, or at least dampening, one's emotions. Furthermore, higher proportions of observer memories are found to be associated with outcomes on different avoidance measures (in depressed participants: e.g., Kuyken & Moulds, 2009; Williams & Moulds, 2007; in traumatised participants: e.g., Kenny & Bryant, 2007; McIsaac & Eich, 2004), again suggesting that the observer perspective may be an avoidance strategy.

Following the established associations between the use of an observer perspective during recall and MDD/PTSD, and given the presence of trauma and associated (painful) emotions, affect instability, and difficulties regarding the stability of the self in BPD patients (e.g., Zeigler-Hill & Abraham, 2006, but see also the BPD criteria in DSM-IV, APA, 1994), we hypothesised that BPD features would be positively associated with the frequency of observer memories. Additionally, we explored the role of self-discrepancy in relation to vantage perspective during recall.

METHODS

PARTICIPANTS

One hundred forty-eight participants (66 males), all between 17 and 30 years of age (*M* = 21.34; *SD* = 3.22) participated and were recruited by the second author, Jasmin Reza, using her personal social network and its extensions (convenience sampling). The majority (60.2%) held a high school diploma, 11.5% held college level degrees, and 14.9% held master level degrees.

INSTRUMENTS

Autobiographical Memory Test (AMT, Williams & Broadbent, 1986; Dutch written minimal instructions version with adaptation towards the concept of discrepancy, Schoofs, Hermans, & Raes, 2012). In a first phase participants were presented with 20 cue words. Clinicians had judged half of these cues to be high discrepant (HD) for depressed patients, whereas the other half was not (i.e. low discrepant, LD; for details, see Schoofs et al., 2012), but all cues had a positive valence. HD and LD cues were alternated, starting with a LD cue: *polite, happy, honest, enjoying, just, optimistic, respectful, energetic, sincere, satisfied, intelligent, pleasurable, neat, self-assured, sensitive, relaxed, grateful, successful, reliable*, and *active*. Respondents were instructed to write down autobiographical memories in response to each of the cues that were

orally presented. Time limits were set at one minute per cue. In a second phase participants were asked to go over their responses again and to judge vantage point of the retrieved memories by scoring each memory as 'P1' (being a field memory or memory retrieved from a 1st person perspective), or 'P3' (being an observer memory or a memory retrieved from a 3rd person perspective). Occasionally, respondents did not succeed to respond with a valid memory to a cue. These answers were coded as 'No Response' by the experimenters afterwards. Respondents were also asked to rate their memories with respect to memory specificity, but these data go beyond the objective of this chapter. Variable of interest is the total proportion of memories retrieved while using an observer perspective (%O). To compute %O, we only included the valid memories, excluding the answers coded as 'No Response'. Therefore, %O is the complement of the proportion of field memories. The written AMT has been used successfully previously to assess memory specificity (e.g., Henderson, Hargreaves, Gregory, & Williams, 2002; Raes et al., 2008).

Borderline Syndrome Index (BSI, Conte, Plutchik, Karasu, & Jerrett, 1980; Dutch translation, Vertommen & Van de Wygaert, 1988). The BSI consists of 52 items describing features and characteristics of BPD. Items are judged on presence, and should therefore be answered with 'yes' or 'no'. Total scores range from 0 to 52, with higher scores reflecting greater levels of BPD pathology. Internal consistency in our sample was high, Cronbach's alpha = .89, for the total score. A four factor model was revealed in the Dutch version (Vertommen & Van de Wygaert, 1988): Subscales measure Negative Self-Definition (NSD; 13 items, Cronbach's alpha = .85), Difficult Interpersonal Relationships (DIR; 11 items, Cronbach's alpha = .69), Failing Social Skills (FSS; 10 items, Cronbach's alpha = .65), and Anxiety (ANX; 16 items, Cronbach's alpha = .60). Convergent validity of the Dutch translation we used was found to be high, *r* =.75 (tested with the Diagnostic Interview for Borderline, Vertommen & Van de Wygaert, 1988).

Depression Anxiety Stress Scales - Depression Scale (DASS21-D, Lovibond & Lovibond, 1995; Dutch version, de Beurs, van Dyck, Marquenie, Lange, & Blonk, 2001). We were only interested in the Depression subscale (7 items, Cronbach's alpha = .81 in the present study) of this 21-item self-report questionnaire. Respondents should score every item by indicating on a 4-point Likert scale to what extent the content of the item applied to them over the past week, ranging from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*). Higher scores indicate higher symptom severity. Psychometric properties were found to be good (de Beurs et al., 2001).

PROCEDURE

This study was part of a larger study. Following written informed consent participants were invited to complete a battery of measures, including the ones described above, in the order presented above. Data administration was organised individually. Except for the AMT, no time limits were set. Most participants finished the test battery within one hour. This study was approved by the Ethical Committee of KU Leuven.

RESULTS

SAMPLE CHARACTERISTICS

Table 11 includes the means, standard deviations, and ranges on all included variables. BPD complaints were limitedly reported (total BSI: *M* = 8.40, *SD* = 7.42, with a theoretical maximum score of 52), and depression severity (*M* = 3.32, *SD* = 3.56, with a theoretical maximum score of 21) scores were rather low. Thus, data are as expected in a community sample.

Table 11 Descriptive statistics of the measures used

	M	SD	Range
Autobiographical Memory Test (AMT)			
% O	27.77	.21	0.00 – 75.00
% O-HD	27.54	.23	0.00 – 80.00
% O-LD	27.78	.22	0.00 – 80.00
Borderline Syndrome Index (BSI)			
Negative Self-Definition (NSD)	1.59	2.47	.00 – 13.00
Difficult Interpersonal Relationships (DIR)	1.44	1.73	.00 – 10.00
Failing Social Skills (FSS)	2.31	1.97	.00 – 9.00
Anxiety (ANX)	2.77	2.42	.00 – 11.00
Total score	8.40	7.42	.00 – 40.00
Depression scale of the Depression Anxiety Stress Scales (DASS21-D), total score	3.32	3.56	0 – 17

%O = proportion memories retrieved during full AMT administration using an observer perspective; %O-HD = proportion memories retrieved using an observer perspective following high discrepant AMT cues; %O-LD = proportion memories retrieved using an observer perspective following low discrepant AMT cues.

THE RELATIONSHIP BETWEEN VANTAGE PERSPECTIVE DURING RECALL AND BORDERLINE SYMPTOMS

Table 12 shows the correlations between the proportions of observer memories (in total as well as following high and low discrepant cues), and BPD symptom clusters as measured by the BSI. We controlled for depression severity (DASS21-D), to exclude that observed associations were solely due to shared associations with depressive symptoms, and for age, given that the proportion of observer memories was found to be significantly associated with participant's age (see Table 13). The proportion of memories retrieved while using an observer perspective (%O) was not, as hypothesised, systematically associated with the total BSI score.

Table 12 Correlations between the proportions of observer memories in total and following high and low discrepant cues, and borderline symptoms (BSI)

		1	2	3	4	5	6	7	8
1.	**% O**	-	.90**	.88**	.04	.14	.17	.11	.14
2.	**% O-HD**	.90**	-	.60**	.06	.19*	.20*	.10	.16
3.	**% O-LD**	.88**	.57**	-	-.00	.06	.09	.09	.07
4.	**BSI – NSI**	.02	.05	-.02	-	.64**	.62**	.67**	.90**
5.	**BSI – DIR**	.14	.19*	.04	.52**	-	.51**	.49**	.77**
6.	**BSI – FSS**	.16	.20*	.08	.40**	.36**	-	.53**	.79**
7.	**BSI – ANX**	.11	.09	.10	.53**	.34**	.37**	-	.84**
8.	**BSI – TOT**	.15	.18	.07	.81**	.70**	.69**	.79**	-

Depression and age are partialled out in the correlations beneath the diagonal.

%O = proportion observer memories retrieved during full AMT administration; %O-HD = proportion observer memories following high discrepant cues; %O-LD = proportion observer memories following low discrepant cues; BSI-NSI = negative self-image; BSI-DIR = difficult interpersonal relationships; BSI-FSS = failing social skills; BSI-ANX = anxiety; BSI-TOT = total BSI-score.

* $p < .05$, ** $p < .01$.

Table 13 Correlations between depression severity (DASS-D), age, and the proportions of observer memories in total and following high and low discrepant cues

		2	3	4	5
1.	**DASS-D**	-.11	.04	.04	.02
2.	**Age**	-	-.26**	-.22**	-.25**
3.	**% O**		-	.90**	.88**
4.	**% O-HD**			-	.60**
5.	**% O-LD**				-

DASS-D = depression severity; %O = proportion observer memories retrieved during full AMT administration; %O-HD = proportion observer memories following high discrepant cues; %O-LD = proportion observer memories following low discrepant cues.

* $p < .05$, ** $p < .01$.

FURTHER EXPLORATORY ANALYSES

Table 11 includes the proportion of observer memories following HD and LD cues respectively. These proportions do not significantly differ, t = -.142, p = .888, nor do they differ from the proportion of observer memories retrieved irrespective of discrepancy (%O), t = -.278, p = .782, and t = .012, p = .991, for %O-HD and %O-LD versus %O, respectively.

We further explored the associations between the total proportion of observer memories and separate BPD symptom clusters, as well as the relationships between the proportions of observer memories retrieved following high (HD) and low (LD) discrepant cues and the BSI dimensions. Results are presented in Table 12. All reported p-values (except the ones discussed in the previous section) were corrected for multiple testing using the Benjamini-Hochberg's method (Benjamini & Hochberg, 1995). We found that observer perspective in the case of high discrepant cues (%O-HD) was prominently associated with 'Failing Social Skills' (BSI-FSS), r = .20, p < .05, and with 'Difficult Interpersonal Relationships' (BSI-DIR), r = .19, p < .05. These associations remained when controlling for age and depression severity, r = .20, and r = .19, respectively, both p < .05. No associations were found between BPD features and the proportion of observer memories following low discrepant cues (%O-LD). Given that these correlations are weak, we performed bootstrapping analyses in order to compute 95% confidence intervals around these correlations. Zero was never included in these intervals. 95% CI's range from .020 to .339, and from .027 to .357, for the associations between %O-HD on the one hand and BSI-DIR and BSI-FSS on the other hand, respectively, both uncontrolled for age and depressive symptoms. When controlling for age and depressive symptoms, 95 CI's range from .026 to .343, from .030 to .365, and from .018 to .333, for the associations between %O-HD on the one hand, and BSI-DIR, BSI-FSS, and BSI-total score on the other hand, respectively. Although these associations are weak, bootstrapping analyses suggest they are not trivial.

DISCUSSION

In this chapter we investigated the relationships between the vantage perspective of memories and BPD features. Contrary to our predictions, no association was found between the total proportion of observer memories retrieved and the total number of BPD symptoms reported. Moreover, additional exploratory analyses on the association between cue discrepancy and vantage perspective revealed that equal proportions of observer memories were retrieved in response to high and low discrepant cues. At first sight, these data suggest that respondents high on BPD complaints do not more often adopt an observer perspective during recall compared to healthy controls.

However, broadening our view to the role of cue discrepancy in relation to vantage perspective and BPD symptoms, we found that especially greater proportions of observer memories following *high discrepant cues* were associated with 'Difficult Interpersonal Relationships' (DIR) and 'Failing Social Skills' (FSS), even when we controlled for depressive symptoms and age. These findings suggest that an observer perspective would be more common in those who are less socially skilled. However, taking a closer look to the FSS-subscale of the BSI, we discovered that these items rather refer to anxious-neurotic behaviours that are often thought to be typical for cluster C personality disorders (APA, 1994). Example items are, e.g., "I never accomplish as much as I could", "I am afraid of anything new", "It is hard for me to make decisions", "I feel that I can not run my own life", and "I feel uneasy in crowds, such as when I am shopping or at a movie"[18]. We therefore conclude that, besides difficult interpersonal relationships, cluster C type behaviours, rather than failing social skills,

[18] Van den Wygaert (1990) acknowledges that this factor mainly consists of anxious-neurotic symptoms, but he reasoned that all these symptoms could be considered as examples or consequences of inadequate social skills. Therefore, he chose to name the scale 'Failing Social Skills'.

are associated with higher proportions of observer memories. This is in line with previous findings in (recurrent) depressed patients (Bergouignan et al., 2008; Kuyken & Howell, 2006; Kuyken & Moulds, 2009), who are known to hold higher dispositions on Neuroticism (Bienvenu et al., 2004). With respect to anxiety disorders, on the other hand, who also are considered to be more neurotic, the picture is less clear: Patients with different anxiety diagnoses differ in the perspective they adopt while retrieving memories (Wells & Papageorgiou, 1999). In addition, since higher scores on FSS may also represent low self-esteem, our findings contradict the ones of Libby, Valenti, Pfent, and Eibach (2011, study 1), who found no association between self-esteem and vantage perspective during recall.

Nevertheless, these findings potentially support the idea that high discrepant information may induce a tendency to compare, which is often associated with an observer mode (Kuyken & Moulds, 2009). According to another line of research, high discrepant cues also complicate the retrieval of memories on the content level (Crane, Barnhofer, & Williams, 2007; Schoofs et al., 2012; Van den Broeck, Claes, Pieters, & Raes, 2012 – Chapter 3 in this thesis). Traumatised as well as (previously) depressed patients show a tendency to retrieve categories of events (e.g., “each time I went abroad for my job”) rather than memories referring to specific events that happened only once and did not take longer than one day (e.g., “that one time in that Steak house in Toronto”). This is referred to as overgeneral memory (OGM; for an overview, see: Moore & Zoellner, 2007; Williams et al., 2007). It is assumed that resources that are used during an intentional search process are taken away in favour of processes that aim to maintain a stable self-concept whenever the risk exists that painful memories will be reactivated. Moreover, it is assumed that the recall of overgeneral memories would be facilitated when respondents are explicitly asked to retrieve memories that are consistent with self-discrepant domains (Van den Broeck et al., 2012). For instance, a depressed individual that is asked to retrieve a specific memory in response to the cue word ‘happy’, will be more likely to refer to a category of events. Together with this

line of reasoning, our results seem to suggest that a threatened self-concept thus might promote both the adoption of observer memories and the retrieval of overgeneral memories.

Yet, it should be noted that the correlations reported above are weak, only explaining up to 4% of the other variable's variance. Bootstrapping procedures, though, showed these associations are not trivial, but replications are recommended to heighten the validity of our findings.

Alternatively, broadening the view on imagery perspective to non-clinical subjects, the framework of Libby and Eibach (2011) contradicts the above mentioned theories which both suggest that an observer perspective serves a dampening function. This model is built upon the widespread idea that the self is dual-faceted: One facet considers experiential awareness, the other conceptual knowledge. Whereas the first is fed by environmental features and concrete actions related to it, the latter consists of abstract meaning structures, defining the coherence of a self over time. According to Libby and Eibach (2011), the perspective one adopts while retrieving memories, depends mainly on how one conceptualises the life event in relation to the facets of their self, and not, as hypothesised by the functional avoidance hypothesis, on the negative valence of the event for the individual. The adoption of a field perspective is assumed to address the experiential self, because this perspective evokes concrete features of a situation. An observer memory, on the other hand, would lead people to frame that event in a broader context, e.g., one's self-beliefs, or in relation to other significant events. Difficult, self-discrepant memories are generally considered as highly relevant for one's long-term self, and are more likely to be retrieved using an observer perspective. However, memories that emphasise the continuity in one's self-concept may also be important in terms of the broader context of one's life, and may therefore also been retrieved from an observer's point of view. Moreover, the authors suggest that the adoption of an observer perspective also has the potential to intensify emotional reactions: "Third-person imagery increases emotional response relative to first-person

imagery […] when the meaning of an event in the broader context of one's life evokes a stronger emotional response than does the experience of the concrete details […]. However, when considering the meaning of an event in the broader context of one's life evokes a weaker emotional response than does focusing on the concrete experience, third-person imagery should reduce emotional responses." (Libby & Eibach, 2011, p. 209-210). Unfortunately, our data do not allow to properly study these theoretical considerations, because we neglected to inventory the personal relevancy and/or the emotionality of the memories retrieved. We recommend that future studies would take these extra variables into account, in order to further distinguish between the possible functions of vantage perspective (dampening vs comparing vs meaning in life).

Our findings further suggest that, besides cluster C type behaviours, especially interpersonal BPD symptoms are associated with more observer memories. No clear-cut explanations are available for these specific associations, although we speculate that empathy may be a key concept in attempts to clarify this relationship. Empathy, once defined as "the capacity to understand and respond to the unique affective experiences of another person" (Decety & Jackson, 2006, p. 54) is generally assumed to be beneficial for interpersonal relationships. However, in relation to BPD, Krohn (1974) identified the so-called 'borderline empathy paradox'. The paradox refers to the combination of seemingly enhanced empathic capabilities (see Dinsdale & Crespi, in press, for an overview) with impaired interpersonal functioning in BPD patients. Indeed, recent findings (Harari, Shamay-Tsoory, Ravid, & Levkovitz, 2010) suggest that BPD patients have increased levels of affective empathy ('sensing another's feelings': emotion recognition, emotional contagion; Davis, 1983) and decreased levels of cognitive empathy (perspective taking, theory of mind). More specifically, it is argued that BPD patients more intensely feel the other person's feelings (i.e., higher levels of emotional contagion), and that they miss the higher-order cognitive empathy skills to cope with these intense feelings. Additionally, the intense feelings are presumable

reflected in the observer by the same mechanisms of emotional contagion, resulting in mutual personal distress. We speculate that repetitive experiences of mutual personal distress would undermine the quality of the relationships. In addition, we further speculate that BPD patients, characterised by an unstable sense of self, probably eagerly tune in on all surrounded interpersonal stimuli they can find in order to create a sense of identity and safety. Their dysfunctional empathy system may be, at least in part, a maintaining element in their stable sense of self-instability. Of course, we are aware that a lot of speculations are formulated above that need further investigation. For instance, in relation to empathy, we talk about perspective taking *in general*, while in our and other studies vantage perspective *during recall* was questioned. Also, correlational research falls short in examining the causal relationships that are predicted above. Future research should try to reveal the true relations between these different kinds of imagery and all the hypothesised associations mentioned above.

Also, we underline that data were administered in a community sample, and not in a group of BPD patients. We need to be careful generalising these (correlational) findings in our non-clinical sample to a clinical population, especially because the BSI-distributions are positively skewed and given that the associations found are weak, only explaining up to 4% of each other's variance. Furthermore, we did not collect information on other aspects that can influence the vantage perspective during autobiographical memory recall, such as traumatic experiences, post-traumatic symptoms, and medication use. Finally, cue discrepancy was not determined on a personal level, and with disregard of the clinical sample of interest (because the cues we used were judged to be discrepant for depressed patients, and not for BPD patients). Even so, we neglected to inventory other potentially interesting variables of the autobiographical memories (personal relevancy, emotionality, the extent to which a recalled memory is consistent with the presented cue), of which theorising would benefit. Future research should therefore not only investigate whether it is possible to

replicate the current findings in a clinical sample of BPD patients, but should also incorporate these extra variables to test the hypotheses formulated above.

Interpersonal difficulties and problems with one's self-concept are core features of BPD, causing a great deal of the burden of patients and their surroundings. Therefore, future studies should also explore the potential connections between (lack of aspects of) empathy, social impairments, vantage point, and dissociation. It has been suggested earlier (Van der Hart, Van der Kolk, & Boon, 1998) that dissociation is a highly defensive act in which all feelings are switched off. Rice and Rubin (2009) suggested that vantage perspective would be more ecologically validly measured using a continuous scale, ranging from field to observer perspective. It could be hypothesised that dissociation is at the end of the scale, near observer perspective, since it can be considered the ultimate avoidance strategy. It thus would be interesting to find out how dissociative experiences relate to the quality of interpersonal experiences, and autobiographical mental imagery.

CONCLUSIONS

To conclude then, and notwithstanding the above mentioned limitations, our findings are the first to our knowledge to suggest that vantage perspective during retrieval may be associated with BPD symptoms when cues activate domains that are highly discrepant towards the actual self.

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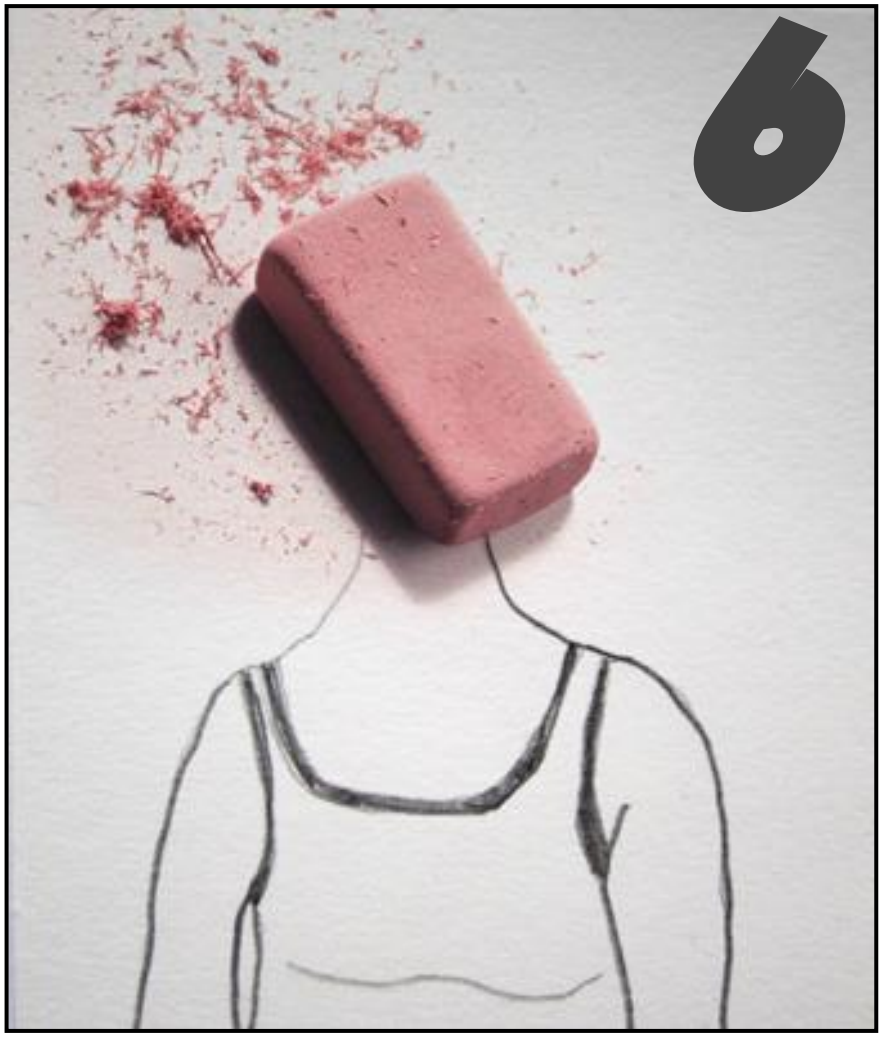

Overgeneral Memory predicts Depression and Trauma Symptom Severity in Borderline Patients

Adapted from:

Van den Broeck, K., Pieters, G., Claes, L., Berens, A., & Raes, F. (submitted). Overgeneral autobiographical memory predicts higher prospective levels of depressive symptoms and intrusions in borderline patients.

ABSTRACT

Overgeneral memory (OGM), the tendency to retrieve categories of events from autobiographical memory instead of single events, is found to be a reliable predictor for future mood disturbances and post-traumatic symptom severity. Patients diagnosed with borderline personality disorder (BPD) often report co-morbid episodes of major depressive disorder (MDD) and post-traumatic stress disorder (PTSD). Therefore, we investigated whether OGM would predict depression severity and post-traumatic stress symptoms (i.e., trauma-related intrusions and avoidance of memories or reminders of the traumatic events) in BPD patients. At admission (N=54) and at six-month follow-up (N ≥ 31), BPD patients completed the Structured Clinical Interview for DSM-IV Disorders, the Autobiographical Memory Test, the Beck Depression Inventory – 2nd edition (BDI-II), and the Impact of Event Scale (IES). Results showed that reduced memory specificity at baseline predicted (a) higher levels of depressive symptoms at follow-up and (b) more post-traumatic intrusions over and above baseline levels of depressive symptoms and intrusions, respectively. No association was found between memory specificity and post-traumatic avoidance at follow-up. It should be noted, though, that our sample was rather small, which is important, given the heterogeneity of the BPD diagnosis. Also, we neglected to include other measures that could help us to disentangle the mechanisms beyond OGM. Yet, despite previous findings suggesting that OGM in BPD is less robust than in MDD and PTSD, our results suggest that memory specificity in BPD patients may have some clinical relevance for the course of depressive and post-traumatic symptomatology in BPD.

INTRODUCTION

Patients suffering from major depressive disorder (MDD; APA, 1994) have robustly shown to have difficulties retrieving specific, detailed information from their autobiographical memory (see, Williams et al., 2007, for a review). Instead of recalling

specific single events (e.g., “Last Friday, when I saw that Amy had forgotten her tennis shoes when she left for her dad”), they tend to retrieve categories of events (e.g., “Every Friday, when the children prepare themselves to stay the weekend at their father’s place”). Due to the fact that OGM is associated with less adaptive (avoidant) coping strategies (e.g., Hermans, Defranc, Raes, Williams, & Eelen, 2005) and impaired social problem solving abilities (e.g., Goddard, Dritschel, & Burton, 1996), OGM has been put forward as a potential vulnerability factor for depression (e.g., Gibbs & Rude, 2004). A recent meta-analysis (Sumner, Griffith, & Mineka, 2010) indeed found that there is a reliable (albeit small) relation between OGM and an unfavourable course of depression. The authors investigated 15 datasets, all containing data on the AMT and depression severity at two time-points. Overall, their analyses revealed that higher levels of OGM at baseline predict higher levels of depressive symptoms at follow-up, over and above the level of depressive symptoms at baseline. Several recent studies corroborated the predictive value of OGM for future depression severity in an adult community sample (Van Daele, Griffith, Van den Bergh, & Hermans, 2014), students (Anderson, Goddard, & Powell, 2010; Boelen, Huntjens, & van den Hout, 2013; Sumner, Mineka, & McAdams, 2013), and younger adolescents (Hipwell, Sapotichne, Klostermann, Battista, & Keenan, 2011; Sumner et al., 2011). These findings suggest that future mood disturbances could be mitigated by improving memory specificity in patients at risk. Indeed, when depressed participants were trained to be more specific, depression severity (Neshat-Doost et al., 2013) and rumination levels were found to decrease (Raes, Williams, & Hermans, 2009).

OGM is also found in patients with post-traumatic stress disorder (PTSD; APA, 1994; see Moore & Zoellner, 2007, for a review), and several studies suggest that OGM may have an important impact on post-traumatic symptom severity as well. For instance, reduced memory specificity was found to predict post-traumatic symptom severity at six-month follow-up in survivors of motor vehicle accidents (Harvey, Bryant, & Dang, 1998) and assault victims (Kleim & Ehlers, 2008), even when initial symptom severity was taken

into account. Yet, Kangas, Henry, and Bryant (2005) found no evidence for OGM as a predictor of post-traumatic symptom severity in a sample of cancer patients. In women who were hospitalised following a complicated pregnancy, pregnancy-related memory specificity alone predicted post-traumatic stress and symptom severity at six weeks post-delivery (Hauer, Wessel, Engelhard, Peeters, & Dalgleish, 2009). When baseline measures were kept constant, however, the impact of memory specificity was only marginally significant. These studies, though, do not exclude the possibility that OGM may be initiated following the traumatic event. Therefore, three studies have investigated whether pre-trauma levels of OGM were able to predict post-traumatic symptoms at follow-up. Memory specificity measured during the training stage of newly hired firefighters (pre-trauma) added to the prediction of post-traumatic symptom severity at four-year follow-up, even when controlled for pre-trauma PTSD or depression severity (Bryant, Sutherland, & Guthrie, 2007). Second, in a non-clinical sample, Belcher and Kangas (2014) found that being more specific when retrieving past and future events may be protective for the development of intrusive images and thoughts during the week following exposure to a trauma film. A third study measured post-traumatic symptom severity with respect to an event that happened between baseline and follow-up (Boelen et al., 2013). In this study, higher levels of students' memory specificity, measured with the Sentence Completion for Past Events Test (SCEPT; Raes, Hermans, Williams, & Eelen, 2007) predicted lower levels of post-traumatic symptom severity at one-year follow-up. Overall, these findings thus suggest that OGM may be a vulnerability factor for post-traumatic stress as well. In line with what was found in depressed patients, memory specificity training in traumatised patients resulted in less intrusions and avoidance symptoms in Iranian war veterans (Moradi et al., 2014).

Different, albeit not mutually exclusive accounts have been proposed to explain OGM in depressed and traumatised patients. According to the functional avoidance hypothesis (Williams et al., 2007), an overgeneral retrieval style preserves the stability of one's

self-concept, because important details and associated emotions of unpleasant past events are not reactivated. Although such a strategy may prevent the development of a (new) depressive episode in the short term, it may lead to enduring post-traumatic symptoms or future mood disorders, perhaps because OGM undermines adequate social problem solving (Boelen et al., 2013; Evans, Williams, O'Loughlin, & Howells, 1992; Sutherland & Bryant, 2008), or maintains a reciprocal relation with ruminative processes (Boelen et al., 2013; Bryant et al., 2007; Kleim & Ehlers, 2008). Cognitive models on PTSD suggest that OGM for traumatic memories may hinder the integration ('processing') of these events with other autobiographical memories and one's self-concept (e.g., Dalgleish, 2004; Ehlers & Clark, 2000; Foa & Hearst-Ikeda, 1996). Additionally, long-lasting intrusions are hypothesised to absorb resources that could otherwise be used for effortful memory search (McNally, Litz, Prassas, Shin, & Weathers, 1994; Wessel, Merckelbach, & Dekkers, 2002; Williams, 1996). Finally, it is hypothesised that especially reduced specificity in imagining future events, which is assumed to use the same pathways than memory retrieval (Schacter, Addis, & Buckner, 2007), contributes to future levels of post-traumatic stress (Boelen et al., 2013; Belcher & Kangas, 2014).

Patients suffering from borderline personality disorder (BPD) often report co-morbid MDD and PTSD (Grant et al., 2008). However, in cross-sectional studies, OGM in BPD is only inconsistently found (for a review, see Van den Broeck, Claes, Pieters, Hermans, & Raes, in press – Chapter 2 in this thesis). Whereas some studies suggest that OGM in BPD is mainly associated with a co-morbid diagnosis of MDD (e.g., Artnz, Meeren, & Wessel., 2002; Kremers, Spinhoven, & van der Does, 2004), others do not find an association between depression and OGM in BPD patients (Maurex et al., 2010; Reid & Startup, 2010; Renneberg, Theobald, Nobs, & Weisbrod, 2005). OGM in BPD has never been found to be related with a co-morbid diagnosis of PTSD (Kremers et al., 2004; Renneberg et al., 2005). To our knowledge, only one study (Kremers, Spinhoven, van der Does, & van Dyck, 2006) investigated whether memory specificity at baseline would

predict depression severity at 15-months in BPD patients. Measures of memory specificity did not make a significant contribution above depression severity at baseline.

The aims of the current study were to investigate the predictive value of memory specificity for depression severity and post-traumatic symptoms at six-month follow-up in a sample of BPD patients. Based on the findings of Sumner et al. (2010), we hypothesised that OGM would predict future depressive symptoms at six-month follow-up. Based on the findings in patients with PTSD, we further hypothesised that OGM would predict the frequency of intrusive thoughts, and the attempts to avoid trauma-related elements – both central symptoms of PTSD (APA, 1994).

METHOD

PROCEDURE AND PARTICIPANTS

This study was part of a larger study investigating autobiographical memory in BPD patients. Following oral and written informed consent, participants were asked to complete a battery of tests and questionnaires. Due to practical issues, data collection per participant often took more than one session, but in most cases a respondent's protocol was completed within a three week timespan. Five months after initial testing, participants were contacted again by e-mail or by phone to make appointments for follow-up measurements. Reassessment took place in the hospital. We used a computerised version of the BDI-II and the IES, using the open source software Limesurvey. The study was approved by the ethical committees of the University of Leuven and the psychiatric hospitals where the study was conducted.

Participants at T1 were 54 patients (8 males), all meeting DSM-IV BPD criteria (APA, 1994) according to the SCID-II interview (SCID-II; First, Gibbon, Spitzer, Williams, & Benjamin, 1997; Dutch translation by Weertman, Arntz, & Kerkhofs, 2000). All participants were between 18 and 51 years of age (M = 29.48, SD = 8.37). They were recruited in two Belgian psychiatric hospitals: University Psychiatric Centre KU Leuven,

Campus Kortenberg (77.78%) and Psychiatric Hospital Duffel (22.22%). Most patients were inpatients (79.63%) staying at a general psychiatric ward (46.51%), at a specialised unit treating BPD according to the principles of Dialectical Behavioural Therapy

Table 14 Sample characteristics at T1 for the total sample (n = 54), and for the subsample (n = 33) with complete data at T2

	Total sample (n = 54; 8 males)	**Subsample (n = 35; 5 males)**
Age (M, SD)	29.48 (8.37)	30.60 (8.45)
Education level (%)		
Primary school	9.3	8.6
High school	53.7	48.6
College	25.9	28.6
University	11.1	14.3
Civil state (%)		
Single	63.0	71.4
Living together	26.0	17.1
Married	3.7	2.9
Divorced	7.4	8.6
Occupation (%)		
Student	9.3	5.7
Unemployed	38.9	37.1
Working / on sick leave	48.1	54.3
Other	3.7	2.9
N Kortenberg/N Duffel	42 / 12	26 / 9
N Inpatient/N outpatient	43 / 11	24 / 11
Inpatient (%) at		
General psychiatric ward	46.5	50.0
Specialised DBT unit	34.9	37.5
Specialised anxiety unit	18.6	12.5

(34.88%) or at a unit specialised in the treatment of anxiety disorders (18.60%). Eleven patients followed day treatment and outpatient emotional skills trainings, organised by the above mentioned hospitals.

At six-month follow-up, complete data were available for 31 of the original 54 participants. Four patients could not be reached for follow-up, ten participants refused to take part in the study at T2, and nine participants had incomplete protocols. Tables 14 and 15 display the sample characteristics for the total sample at T1 and the reduced sample at T2. Patients with complete and incomplete follow-up data did not differ significantly at baseline with respect to the variables of interest (AMT, BDI-II, IES). BDI-II scores at T2 are significantly lower than those at T1, $t(32) = 2.80$, $p < .01$, ranging from

Table 15 Descriptive statistics of the measures used at T1 (n = 54) and T2 (n = 34, except for BDI-II, n = 33)

	T1	**T2**
SCID-I		
Current depressed	18	5
Remitted depressed	26	25
Never depressed	10	4
BDI-II (M, SD)	30.93 (13.27)	25.30 (16.28)
IES		
Total score (M, SD)	41.75 (17.42)	39.85 (19.42)
Intrusions (M, SD)	21.36 (10.20)	19.56 (10.70)
Avoidance (M, SD)	20.40 (9.37)	20.29 (10.48)
AMT		
Number of specific memories (M, SD)	14.59 (2.39)	14.70 (2.33)
Number of categoric memories (M, SD)	.96 (1.16)	.74 (1.38)

SCID-I = depression module of the Structured Clinical Interview for DSM-IV Disorders, Axis I; BDI-II = Beck Depression Inventory-II; IES = Impact of Event Scale; AMT = Autobiographical Memory Test.

the 'severely depressed' (T1) scoring range to 'moderately depressed' (T2), but AMT measures and IES scales at T1 do not differ from those at T2 (all *p*s > .277).

INSTRUMENTS

Structured Clinical Interview for DSM-IV Disorders, Axis II (SCID-II, First et al., 1997; Dutch translation by Weertman et al., 2000). The SCID-II is a semi-structured interview that systematically assesses DSM-IV Axis II disorders (APA, 1994). All SCID-II interviews were conducted by the first author, who is trained to use the SCID-II. The SCID-II items were scored on a 3-point scale ranging from not *applicable*, *applicable but not sufficiently present*, to *present*. Scores reflect the presence or absence of 12 personality disorders (all DSM-IV personality disorders plus depressive and passive-aggressive personality disorder). Interrater reliability of the SCID-II ranges from .90 to .98 for dimensional judgements and internal consistency ranges from .71 to .94 (Maffei et al., 1997).

Structured Clinical Interview for DSM-IV Disorders, Axis I (SCID-I, First, Spitzer, Gibbon, & Williams, 1997; Dutch translation by van Groenestijn, Akkerhuis, Kupka, Schneider, & Nolen, 1999). This semi-structured interview assesses DSM-IV Axis I disorders (APA, 1994). We only administered the MDD and PTSD modules. Again, interviews were performed by the first author. For the module on MDD, satisfactory test-retest reliability (κ = .61) and interrater reliability (κ = .80) are reported (Zanarini et al., 2000). For the module on PTSD, satisfactory test-retest reliability (κ = .78) and interrater reliability (κ = .88) are reported (Zanarini et al., 2000).

Autobiographical Memory Test (AMT, Williams & Broadbent, 1986; Dutch version). In the AMT, respondents are presented with 18 cues (*happy, sad, safe, angry, interested, clumsy, successful, emotionally hurt, surprised, lonely, relaxed, guilty, proud, afraid, pleasant, cowardly, carefree,* and *lazy*) that are read aloud by the experimenter. Participants are invited to retrieve specific memories that the cues remind them of. The

definition of a specific autobiographical memory is explained by using an example. Three example cues are presented before the actual task to check whether the participants understood the assignment. Answers were immediately coded as 'specific', 'general categoric' (if the response refers to a category of events), 'general extended' (if the answer refers to an event that took longer than one day), 'no memory' (e.g., a semantic association in response of the cue), or 'same event' (whenever the retrieved memory was identical to a memory retrieved in response to a previous cue). If respondents first retrieved a general memory or a memory that had been retrieved earlier in response to another cue, they were prompted to search for specific memories again. If no memory had been found in 60 seconds, the next cue is presented and the answer is coded as 'omission'. We were especially interested in the number of general categoric memories retrieved. We further computed the number of specific memories retrieved, and, to correct for the number of omissions, the proportions of specific and general categoric memories[19]. AMT administration was audiotaped. Ten percent of the answers to AMT cues were re-coded by a second rater. Interrater reliability was .89, over both AMT admissions.

Beck Depression Inventory-II (Beck, Steer, & Brown 1996; authorised Dutch translation (BDI-II-NL) by van der Does, 2002). This self-report questionnaire measures depression severity. It consists of 21 items, each representing a specific depressive symptom (e.g., pessimism, guilt, suicidal ideations). An item consists of four statements indicating different levels of severity. Participants are asked to mark the statements that best describe how they felt during the last two weeks, the current day included. Item scores differ from 0 to 3; total score ranges from 0 to 63 with higher scores indicating higher

[19] To preserve maximum readability, we do not report the results for the proportional indices of specific (%S) and categoric (%GC) memories, unless they are different from the results using the plain number of specific (S) and categoric (GC) memories.

levels of depressive symptoms. The internal consistency of the total BDI-II in our sample (at T1) was high, Cronbach's alpha = .91.

Impact of Event Scale (IES, Horowitz, Wilner, & Alvarez, 1979; authorised Dutch translation (Schokverwerkingslijst) by Brom, Kleber, & Defares, 1986). The Dutch version of the IES counts 15 items, and aims to inventory to what extent one suffered from trauma-related intrusive thoughts, feelings, and images (7 items), and from avoidance of trauma-related stimuli, thoughts, and feelings (8 items) during the preceding seven days. Prior to these questions, respondents are invited to briefly describe a traumatic event that they will keep in mind while answering the items. Each item has to be scored on a 4-point scale, from *not at all* (0), over *seldom* (1) and *sometimes* (3) to *often* (5), expressing how often what is described in the item caused trouble during the week prior to testing. Total score ranges from 0 to 75; the Intrusions and Avoidance subscales range from 0 to 35, and from 0 to 40, respectively. The internal consistency of the IES scales in our sample (at T1) was high, Cronbach's alpha = .88, Cronbach's alpha = .90, and Cronbach's alpha = .73, for IES total score, IES-Intrusions, and IES-Avoidance, respectively.

RESULTS

DESCRIPTIVES

At six-month follow-up, complete data were available for 31 of the original 54 participants. Nine participants had incomplete protocols[20]. Regression analyses

[20] For five of them, both the BDI-II and the IES at T2 were missing. One participant completed the BDI-II at T2, but not the IES at T1. Another one completed both the IES and the BDI-II at T2, but had missing data on the SCID-I at T2. BDI-II scores at T2 were missing for two other participants (of which one also had missing data on the AMT at T2).

Table 16 Correlations between depression severity, IES scales, and number of specific and categoric memories at T1, and depression severity and IES scales at T2

		2	3	4	5	6	7	8	9	10
1.	**BDI-II (T1)**	.53**	.50**	.46**	-.36*	.21	.69**	.38*	.44**	.25
2.	**IES (T1)**	-	.90**	.90**	-.12	.03	.31	.43*	.37*	.42*
3.	**IES-Intrusions (T1)**		-	.62**	-.13	.12	.35*	.37*	.39*	.29
4.	**IES-Avoidance (T1)**			-	-.09	-.07	.20	.41*	.29	.46**
5.	**S**				-	-.74**	-.50**	-.40*	-.43**	-.29
6.	**GC**					-	.17	.36*	.47**	.20
7.	**BDI-II (T2)**						-	.31	.41*	.17
8.	**IES (T2)**							-	.92**	.92**
9.	**IES-Intrusions (T2)**								-	.69**
10.	**IES-Avoidance (T2)**									-

BDI-II = Beck Depression Inventory-II; IES = total score of the Impact of Event Scale; S = number of specific memories retrieved during Autobiographical Memory Test (AMT) administration; GC = number of general categoric memories retrieved during AMT administration.

* $p < .05$, ** $p < .01$.

predicting BDI-II and IES scores at T2 could be conducted for 33 and 34 participants, respectively.

The IES was completed on traumatic experiences related to personal assaults (n = 10 at T1; n = 12 at T2); interpersonal problems (n = 7; n = 5); the death or parting of a family member (n = 6; n = 7); personal illness (n = 4; n = 2); illness of a family member (n = 3; n = 1); personal injury or suicide attempt (n = 0; n = 1) or other experiences that could not be classified in one of the categories above (n = 4; n = 5). One trauma description was missing at T2. Although the life event reported at T1 could differ from that at T2, most respondents thought about a similar kind of traumatic event at both times, $\chi^2 = 77.20$, $p < .001$.

PREDICTION OF DEPRESSION SEVERITY AT SIX-MONTH FOLLOW-UP

Table 16 presents the correlations between the baseline variables (AMT[21], BDI-II) and BDI-II scores at follow-up. Given the high correlation between the number of specific (S) and categoric memories (GC), we decided to conduct separate regression analyses, both with BDI-II scores at T2 as the dependent variable. To control for depression severity and depressive state at T1, BDI-II score and depressive state (current/remitted depressed vs never depressed) at T1 were entered in Block 1. S and GC were entered in

[21] Besides the standard AMT, we also administered a personalised AMT for each respondent, consisting of the ten most self-discrepant self-guides the respondent formulated. According to Conway et al. (2004), cues that tap into domains that are highly self-discrepant towards one's actual self-concept evoke more overgeneral memories. However, as reported elsewhere, pAMT administration in BPD patients resulted in less categoric memories and more omissions than standard AMT administration (Van den Broeck, Pieters, Claes, Berens, & Raes, submitted – Chapter 4 of this thesis). Also, in this study, no association was found between memory specificity measured with the pAMT at T1 and depression severity and the IES scales at T2.

Table 17 Summary of the hierarchical regression analyses results for the variables predicting depression severity (BDI-II) at 6 months (n = 33)

	B	*SE B*	*β*	*p-value*	R^2	*p-value*
DV: BDI-II – 6 months						
Step 1						
Constant	-1.65	5.84				
BDI-II – T1	**.86**	**.17**	**.69**	**< .001**		
Depressed state (ever vs never depressed)	1.19	5.58	.03	.832	.48	< .001
Step 2						
Constant	29.77	15.21				
BDI-II – T1	**.73**	**.17**	**.59**	**< .001**		
Depressed state (ever vs never depressed)	2.22	5.27	.05	.677		
Number of specific memories	**-1.90**	**.86**	**-.30**	**.035**	**.55**	**< .001**
Step 2						
Constant	-1.82	5.96				
BDI-II – T1	**.85**	**.17**	**.69**	**< .001**		
Depressed state (ever vs never depressed)	1.08	5.68	.03	.850		
Number of categoric memories	.45	1.69	.04	.792	.48	< .001

When DV (Dependent Variable) = BDI-II at 6 months: ΔR^2 = .08 for Step 2 (p = .035) when adding number of specific memories at T1 as a predictor. ΔR^2 = .00 for Step 2 (p = .792) when adding number of categoric memories at T1 as a predictor.

Block 2, respectively. Results are presented in Table 17. Block 1 accounted for 47.6% of the variance of the BDI-II scores at follow-up, with only BDI-II scores at T1 reaching

significance. Unlike GC, adding S[22] in Block 2 to the equation significantly increases R^2 with 7.6%, *F*change = 4.91, $p < .05$. This means that higher levels of memory specificity at T1 predict lower levels of depressive symptoms at T2, when controlled for depressive symptoms and depressive state at T1.

PREDICTION OF IES AT SIX-MONTH FOLLOW-UP

Table 16 also presents the correlations between the IES scales, S, and GC at baseline, and the IES scales at follow-up. S and GC at T1 were significantly associated with IES total score and IES-Intrusions at T2, but not with IES-Avoidance. We therefore conducted regression analyses with IES total score (Table 18) and IES-Intrusions (Table 19) at T2 as dependent variables, and AMT variables as independent variables, controlling for IES total score and IES-Intrusions at T1, respectively, besides PTSD status. Both S and GC added significantly to the prediction of both IES total score[23] and IES-Intrusions at T2. This means that higher levels of memory specificity at T1 predict lower frequencies of intrusions at T2, when controlled for IES total scores and IES-Intrusions at T1, respectively.

DISCUSSION

This study investigated the predictive value of OGM for depression severity and post-

[22] Adding the proportion of specific memories in Block 2 to the equation does not result in a significant ΔR^2, R^2change = .05 with *F*change = 3.078, $p = .09$, with $\beta = -.23$, $t = -1.75$, $p = .09$, when predicting BDI-II scores at T2.

[23] Adding the proportion of specific memories in Block 2 to the equation results in a marginally significant ΔR^2, R^2change = .096 with *F*change = 3.110, $p = .052$, with $\beta = -.31$, $t = -2.03$, $p = .052$, when predicting IES total score at T2.

Table 18 Summary of the hierarchical regression analyses results for the variables predicting IES total score at 6 months (n = 34)

	B	*SE B*	*β*	*p-value*	R^2	*p-value*
DV: IES – 6 months						
Step 1						
Constant	22.89	7.75				
IES – T1	.35	.20	.34	.087		
PTSD at T1 (current vs no PTSD)	6.83	7.66	.17	.380	.21	.028
Step 2						
Constant	65.74	19.19				
IES – T1	.30	.19	.28	.124		
PTSD at T1 (current vs no PTSD)	7.64	7.14	.19	.293		
Number of specific memories	**-2.80**	**1.16**	**-.36**	**.022**	**.34**	**.022**
Step 2						
Constant	18.40	7.58				
IES – T1	.34	.19	.33	.080		
PTSD at T1 (current vs no PTSD)	6.85	7.22	.17	.351		
Number of categoric memories	**5.13**	**2.31**	**.33**	**.034**	**.32**	**.034**

When DV (Dependent Variable) = IES total score at 6 months: ΔR^2 = .13 for Step 2 (p = .025) when adding number of specific memories at T1 as a predictor. ΔR^2 = .11 for Step 2 (p = .034) when adding number of categoric memories at T1 as a predictor.

traumatic symptoms at six-month follow-up in a sample of BPD patients. Depression severity at follow-up was predicted by the number of specific memories retrieved at baseline, over and above baseline depression severity levels. More specific memories at baseline thus correspond with lower levels of depression six months later. This finding was not replicated for the number of categoric memories, nor for the proportions of specific or categoric memories, however. Furthermore, in line with our expectations,

Table 19 Summary of the hierarchical regression analyses results for the variables predicting IES-Intrusions at 6 months (n = 33).

	B	*SE B*	*β*	*p-value*	R^2	*p-value*
DV: IES-Intrusions – 6 months						
Step 1						
Constant	11.40	4.05				
IES-Intrusions – T1	.39	.21	.38	.071		
PTSD at T1 (current vs no PTSD)	.07	4.53	.00	.988	.15	.083
Step 2						
Constant	37.34	10.69				
IES-Intrusions – T1	.32	.19	.32	.107		
PTSD at T1 (current vs no PTSD)	.72	4.17	.03	.865		
Number of specific memories	**-1.70**	**.66**	**-.40**	**.015**	**.30**	**.015**
Step 2						
Constant	9.24	3.77				
IES-Intrusions – T1	.32	.19	.31	.108		
PTSD at T1 (current vs no PTSD)	.84	4.13	.04	.840		
Number of categoric memories	**3.50**	**1.29**	**.41**	**.011**	**.32**	**.011**

When DV (Dependent Variable) = IES-Intrusions at 6 months: ΔR^2 = .16 for Step 2 (p = .013) when adding number of specific memories at T1 as a predictor. ΔR^2 = .17 for Step 2 (p = .010) when adding number of categoric memories at T1 as a predictor.

memory specificity (both number and proportions of specific and categoric memories) predicted the frequency of traumatic intrusions, even when we controlled for the presence of intrusions at baseline. Contrary to our expectations, we found no association between avoidance levels at follow-up and memory specificity at baseline. Still, these findings suggest that, although cross-sectional associations between OGM and MDD and PTSD in BPD patients are inconsistently found, OGM in BPD patients may

still be of clinical relevance, in that is has some predictive value for the course of post-traumatic and, to a lesser extent, depressive symptomatology.

Although this study is line with previous findings on OGM predicting the course of depression (Sumner et al., 2010), it contradicts the only study conducted in BPD patients focusing on the predictive value of OGM for depression severity: Kremers et al. (2006) found that memory specificity was not a significant predictor for depression severity at 15-months follow-up in a sample of BPD patients. Perhaps the longer time between T1 and T2 (15 months) in Kremers et al.'s study could explain this discrepancy. Indeed, Sumner et al. (2010) in their meta-analysis found that the impact of memory specificity on future mood declines when time-points are further apart. Alternatively, it should be noted that Kremers et al. used an adapted version of the standard Autobiographical Memory Test (AMT; Williams & Broadbent, 1986), in which participants were explicitly instructed to retrieve "moments at which they exhibited the trait" that was used as a cue. We were less stringent during the AMT administration, and used the standard AMT instructions, asking participants to retrieve specific memories "that the cue reminded them of". Nevertheless, given that only two studies are available today with inconsistent findings, replication is necessary to further explore the role of OGM (in co-morbid disorders and associated symptoms) in BPD patients.

Our study also extends previous findings on OGM as a predictor of post-traumatic symptom severity, i.e., the frequency of intrusions and IES total score, which has never been studied in a sample of BPD patients. However, although both intrusions and avoidance are considered core features of PTSD and MDD, we found no association between OGM at T1 and (cognitive, behavioural, emotional) avoidance at T2. To our knowledge, except for Hauer et al. (2009), studies focusing on the predictive value of OGM for post-traumatic symptom severity have never used the IES to measure post-traumatic stress. In addition, none of these prospective studies has reported on facets of traumatic stress. Yet, in cross-sectional studies, sometimes IES-Avoidance, but not IES-Intrusions was associated with memory specificity (e.g., Brewin, Watson, McCarthy,

Hyman, & Dayson, 1998; Kuyken & Brewin, 1995), whereas others found AMT performance to be related with IES-Intrusions, but not with IES-Avoidance (e.g., Brewin, Reynolds, & Tata, 1999). According to Wessel et al. (2002), these inconsistencies may reflect the unreliability of the IES. Alternatively, and with respect to our sample of BPD patients, the non-significant associations between measures of memory specificity at T1 and IES-Avoidance at T2 may be due to a lack of power.

Based on these findings, we tentatively hypothesise that even BPD patients, in whom OGM in cross-sectional designs is inconsistently found (Van den Broeck et al., in press – see Chapter 2), may profit from memory specificity training (MeST; Raes, Williams, & Hermans, 2009) as demonstrated in depressed (Neshat-Doost et al., 2013) and traumatised patients (Moradi et al., 2014). Although the added variance for depression severity at follow-up explained by memory specificity at baseline is rather small (7.6%), given that β_S = -.30, an increase with one SD at the AMT would result in a decrease of 4.88 points at the BDI-II at follow-up. Likewise, the future score at the IES Intrusions scale would decline with 4.28 points.

However, our study is not without limitations. We did not include measures on executive functioning, rumination, social problem solving, and future imagining; which prevents us from disentangling the mechanisms beyond OGM. Furthermore, it should be noted that we tested our hypotheses in a rather small sample of BPD patients, which is important, given the heterogeneity of the BPD diagnosis. Nevertheless, our results suggest that, although cross-sectional associations between OGM and MDD and PTSD in BPD patients are inconsistently found, OGM in BPD patients too may be clinically relevant in order to mitigate the course of depression and trauma symptoms.

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Overgeneral Memory and Non-Suicidal Self-Injury in Borderline Personality Disorder

Adapted from:

Van den Broeck, K., Claes, L., Pieters, G., Berens, A., & Raes, F. (submitted). Autobiographical memory specificity and non-suicidal self-injury in borderline personality disorder.

ABSTRACT

Depressed and traumatised patients tend to recall categories of events from memory, rather than specific memories. This is called overgeneral memory (OGM). OGM is considered to be a (cognitive) strategy to regulate negative affect. Contrary to the expectations, borderline personality disorder (BPD) patients only inconsistently show OGM. Instead, they seem to regulate difficult emotions more behaviourally, with non-suicidal self-injury (NSSI). This study investigated how both these affect-regulation strategies relate to each other. Based on earlier findings (Startup et al., 2001), we hypothesised that NSSI and OGM would be inversely related. Fifty-three BPD patients completed the Structured Clinical Interview for DSM-IV Disorders, the Autobiographical Memory Test to assess OGM, and the Self-Injury Questionnaire – Treatment Related (SIQ-TR) to assess NSSI. We found no significant differences in OGM between patients with and without NSSI. However, we found that participants who use more NSSI methods showed less OGM, but this association disappeared when we controlled for age. We propose a balance-model of affect-regulation as one possible explanation for the negative relationship between these two affect-regulation strategies.

INTRODUCTION

Non-suicidal self-injury (NSSI) is defined as any socially unaccepted behaviour involving deliberate and direct injury to one's own body surface without suicidal intent (APA, 1994; Claes & Vandereycken, 2007a; Nock, 2009). It involves behaviours such as severe scratching, bruising, cutting, burning, and biting oneself. NSSI differs from suicidal behaviour with respect to prevalence, functionality, and underlying cognitions (Muehlenkamp, 2005). NSSI usually starts at age 12 to 14 (Jacobson & Gould, 2007), and its frequency declines with age (Zanarini et al., 2008).

Accumulating research now highlights the importance of studying the variety of methods of NSSI, besides and apart from the mere frequency of NSSI. NSSI diversity,

and not the frequency of the NSSI, is found to be associated with different measures of suicidality, such as number of suicide attempts (Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006; and see, Joiner, 2005, for an integrative framework), suicidal ideation (Lynam, Miller, Miller, Bornovalova, & Lejuez, 2011; Turner, Layden, Butler, & Chapman, 2013; Whitlock, Muehlenkamp, & Eckenrode, 2008), and suicide risk (Turner et al., 2013; Zlotnick, Donaldson, Spirito, & Pearlstein, 1997). Furthermore, NSSI diversity correlates positively with levels of impulsivity (Lynam et al., 2011; Turner et al., 2013), emotional dysregulation (Turner et al., 2013), severity of borderline personality disorder (BPD; Lynam et al., 2011), depression severity (Turner et al., 2013), disordered eating (Claes & Muehlenkamp, 2014; Whitlock et al., 2008), and anxiety symptoms (Klonsky & Olino, 2008). In sum, these findings suggest that NSSI diversity is a marker of severity of psychopathology (Jacobson & Gould, 2007).

The functionality of NSSI has been extensively studied, and different frameworks have been put forward (for an overview, see Gordon, Kwan, Minnich, & Carter, 2014). Of all functions, affect-regulation is the most important function of NSSI. Indeed, it is consistently found that patients who engage in NSSI report a strong decrease of negative affect and an increase in positive feelings shortly after NSSI ('experiential avoidance': Chapman, Gratz, & Brown, 2006; Claes & Vandereycken, 2007b; Klonsky, 2007; 'automatic negative reinforcement': Nock & Prinstein, 2004), suggesting that, in the short term, NSSI is an effective coping strategy. In the long term, feelings of guilt and shame are likely to arise. This has a negative impact on one's self-concept (Jacobson & Gould, 2007; Kleindienst et al., 2008), which in turn increases the risk to re-engage in NSSI (Chapman et al., 2006).

Although NSSI is found in a variety of psychopathological conditions, it is traditionally considered as a symptom of BPD (APA, 1994; Klonsky, 2007, 2011; Nock et al., 2006). Zanarini et al. (2008) reported that 89% of their BPD sample had engaged in repeated NSSI two years prior to testing. Additionally, 70% of them used multiple methods. Probably, the high prevalence of NSSI in BPD patients could, in part, be explained by

BPD patients' hypervigilance (Linehan, 1993; Niedtfeldt et al., 2010; Putnam & Silk, 2005; Stiglmayer et al., 2005). That is, BPD patients experience more frequently and more intense aversive feelings and, therefore, might more frequently turn to NSSI as an acute and effective affect-regulation strategy. Indeed, similar to non-BPD participants who engage in NSSI (e.g., Klonsky, 2011), BPD patients too, identify tension reduction as the most prominent motive of NSSI (Kleindienst et al., 2008). In addition, though, findings of Chapman and Dixon-Gordon (2007) also suggest that BPD patients might profit more from the affect-regulating function of NSSI than non-BPD participants.

Another strategy that has been considered an affect-regulation strategy in BPD and other emotional disorders is overgeneral memory (OGM). OGM is a robust finding in depressed patients and patients suffering from post-traumatic stress disorder (for an overview, see: Moore & Zoellner, 2007; Williams et al., 2007). These patients are biased when they are asked to retrieve specific autobiographical memories in response to cue words, like *happy* or *lonely*. Instead of retrieving, as instructed, memories of events that happened only once and did not take longer than one day ('specific memories'; e.g., "Last Easter, when the carrot cake was burnt"), they more often recall overgeneral categoric memories referring to a category of events (e.g., "Every Easter, when I bake a carrot cake"). According to the CaR-FA-X model (Williams et al., 2007) and the Self-Memory System (SMS; Conway, 2005; Conway & Pleydell-Pearce, 2000; Conway, Singer, & Tagini, 2004) overgeneral memory recall is assumed to be beneficial (and in some circumstances even adaptive) in the short term: By not passing through to the final, most detailed stages of a search process, the reactivation of painful memories and associated affective states is avoided ('functional avoidance'). However, in the longer term, OGM potentially contributes to the maintenance and/or onset of a depressed state or post-traumatic stress symptoms. Disregarding event-specific knowledge may be detrimental, because event-specific knowledge is meant to inform one on a here-and-now basis on the progress one makes in order to attain one's personal goals, which could result in adjustments of one's self-concept in the longer term (Conway et al.,

2004). Furthermore, OGM in depressed and traumatised patients has been found to be associated with impaired social problem solving (e.g., Goddard, Dritschel, & Burton, 1996; Sutherland & Bryant, 2008), higher levels of rumination (e.g., Raes et al., 2005; Watkins & Teasdale, 2001), and reduced executive functioning (e.g., Dalgleish et al., 2007).

Grant et al. (2008) reported high co-morbidity rates of major depressive disorder (MDD; 19.3% of BPD patients met MDD criteria during the last 12 months) and post-traumatic stress disorder (PTSD; 31.6% met criteria of PTSD during the last year) in BPD patients. Moreover, BPD patients suffer from an unstable sense of self ('identity confusion', DSM-IV, APA, 1994), disturbed executive resources (Maurex, 2009), and difficulties in social problem solving (e.g., Kremers, Spinhoven, van der Does, & van Dyck, 2006b; Maurex et al., 2010). Therefore, and given the assumed role of OGM as an affect-regulation strategy in psychopathology, we would expect that BPD patients too, would show problems in retrieving specific memories. However, in contrast to NSSI, OGM in BPD is only inconsistently found (see Van den Broeck, Claes, Pieters, Hermans, & Raes, in press –Chapter 2 of this thesis). Whereas some studies suggest that OGM is associated with a diagnosis of BPD (Jones et al., 1999; Maurex et al., 2010; Reid & Startup, 2010), results of other studies do not support such an association (Arntz, Meeren, & Wessel, 2002; Kremers, Spinhoven, & van der Does, 2004; Renneberg, Theobald, Nobs, & Weisbrod, 2005). Additionally, a couple of studies suggest that OGM in BPD is mainly associated with a co-morbid diagnosis of MDD (Artnz et al., 2002; Kremers et al., 2004; Spinhoven, Bockting, Schene, & Williams, 2007; Van den Broeck, Claes, Pieters, & Raes, 2012 – Chapter 3 of this thesis), although others do not find an association between depression and OGM in BPD patients (Maurex et al., 2010; Reid & Startup, 2010; Renneberg et al., 2005 – see also Chapter 4 of this thesis).

Previous studies thus suggest that both OGM and NSSI could serve an affect-regulation function in BPD. Studying how these strategies relate to each other could help to better understand affect-regulation in BPD patients, who are generally characterised by

affective dysregulation. To our knowledge, only three studies so far have investigated the relation between NSSI and OGM in BPD patients. Based on the widespread presence of 'parasuicidal acts' (referring to both suicidal and non-suicidal self-injury) in BPD patients, and the early findings on OGM in BPD patients (Jones et al., 1999), Startup et al. (2001) hypothesised that both concepts would be positively related. However, contrary to their predictions, their sample showed a strong and negative association between the frequency of parasuicidal acts and the number of overgeneral memories retrieved, $r = -.47$, $p < .05$. Startup et al. (2001) argued that OGM in BPD patients may be ineffective, therefore leading to the activation of distressing memories which, in turn, evoke affective dysregulation. This affective dysregulation is then controlled by parasuicidal acts. It should be noted that Startup et al. (2001) made no distinction between NSSI (without the intent to die) and suicidal behaviour. Similarly, the category of general memories they reported on was made up of categoric as well as extended memories (referring to an event that lasted longer than one day; e.g., "When I went abroad for a couple of days, last Easter"). In a later study, Renneberg et al. (2005) did not find any association between the frequency of self-mutilation (no definition given) and the number of specific memories retrieved in their sample of BPD patients. In a final study, Maurex et al. (2010) did not find an association either between the frequency of NSSI and the number of specific memories recalled in BPD patients.

In order to get a clearer view on affect-regulation in BPD, the present study aimed to examine the association between NSSI and OGM in BPD patients. Based on the findings of Startup et al. (2001), we expected an inverse relationship between the frequency (presence) of NSSI and OGM. However, the opposite prediction could be made as well. Based on the fact that both OGM and NSSI are positively related to avoidance tendencies (NSSI: e.g., Claes et al., 2010; Najmi et al., 2007; OGM: e.g., Hermans, Defranc, Raes, Williams, & Eelen, 2005; Muenks, 2010), one could also reasonably expect both central variables to be positively instead of negatively related. Additionally,

given that recent studies underline the importance of NSSI diversity apart from NSSI frequency, we also studied the association between OGM and the number of NSSI methods reported.

METHOD

PARTICIPANTS

Fifty-five patients (8 males), all meeting DSM-IV BPD criteria (APA, 1994) according to the SCID-II interview (SCID-II, First, Gibbon, Spitzer, Williams, & Benjamin, 1997; Dutch translation by Weertman, Arntz, & Kerkhofs, 2000) participated in the study. Two female participants had incomplete protocols, and were deleted from the analyses. The remaining participants were between 18 and 51 years of age (*M* = 29.47; *SD* = 8.45). Most participants were single (62.26%). The majority (54.72%) held a high school diploma, 26.42% held a college level degree, and 9.43% held a master level degree. Participants were recruited in two Belgian psychiatric hospitals: University Psychiatric Centre KU Leuven, Campus Kortenberg (77.36%) and Psychiatric Hospital Duffel (22.64%). Most patients (79.25%) were inpatients, staying at a general psychiatric ward (47.62%), at a specialised unit treating BPD according to the principles of Dialectical Behavioural Therapy (DBT; Linehan, 1993; 35.71%), or at a unit specialised in the treatment of anxiety disorders (16.67%). The other patients (20.75%) followed day care treatment and outpatient emotional skill trainings, organised by the above mentioned hospitals.

INSTRUMENTS

Structured Clinical Interview for DSM-IV Disorders, Axis II (SCID-II, First et al., 1997; Dutch translation by Weertman et al., 2000). The SCID-II is a semi-structured interview that systematically assesses DSM-IV Axis II disorders (APA, 1994). All SCID-II interviews were conducted by the first author, who is trained to use this instrument. The SCID-II

items were scored on a 3-point scale ranging from *not applicable*, *applicable but not sufficiently present*, to *present*. Scores reflect the presence or absence of 12 personality disorders (all DSM-IV personality disorders plus depressive and passive-aggressive personality disorder). Interrater reliability of the SCID-II ranges from .90 to .98 for dimensional judgements and internal consistency ranges from .71 to .94 (Maffei et al., 1997).

Autobiographical Memory Test (AMT, Williams & Broadbent, 1986; Dutch version). In the AMT, respondents are presented with 18 cues (*happy, sad, safe, angry, interested, clumsy, successful, emotionally hurt, surprised, lonely, relaxed, guilty, proud, afraid, pleasant, cowardly, carefree,* and *lazy*) that are read aloud by the experimenter. Participants are invited to retrieve specific memories. The definition of a specific autobiographical memory is explained by using an example. Three example cues are presented before the actual task to check whether the participants understood the assignment. Answers were immediately coded as 'specific', 'general categoric' (if the response refers to a category of events), 'general extended' (if the answer refers to an event that took longer than one day), 'no memory' (e.g., a semantic association in response of the cue), or 'same event' (whenever the retrieved memory was identical to a memory retrieved in response to a previous cue). If respondents first retrieved a general memory or a memory that had been retrieved earlier in response to another cue, they were prompted to search for specific memories again. If no memory had been found in 60 seconds, the next cue is presented and the answer is coded as 'omission'. We were especially interested in the number of general categoric memories retrieved. We further computed the number of specific memories retrieved, and, to correct for the number of omissions, the proportions of specific and general categoric memories[24].

[24] To preserve maximum readability, we do not report the results for the proportional indices of specific (%S) and categoric (%GC) memories, unless they are different from the results using the plain number of specific (S) and categoric (GC) memories.

AMT administration was audiotaped. Ten percent of the answers to AMT cues were re-coded by a second rater. Interrater reliability was .90.

Self-Injury Questionnaire – Treatment Related (SIQ-TR; Claes, Vandereycken, & Vertommen, 2007b). The SIQ-TR is a paper-and-pencil questionnaire on non-suicidal self-injurious behaviour. Respondents are asked to indicate how long ago (ranging from *a week ago* to *never*) they performed each of five types of NSSI (severe scratching, bruising, cutting, burning, and biting oneself). Additional questions on taxonomy (frequency, location on the body, intensity of pain, planning) and functionality (affect scores before and after NSSI, motives of NSSI) were asked for each NSSI behaviour that was performed during the past month. The SIQ-TR thus allows to distinguish between participants who only recently (during the past month), ever (lifetime), or never have hurt themselves, as well as between patients who use one or more NSSI methods.

PROCEDURE

This study was part of a larger study investigating autobiographical memory in BPD patients. Following oral and written informed consent, participants were asked to complete a battery of tests and questionnaires. Due to practical issues, data collection often took more than one session, but in most cases a respondent's protocol was completed within a three week timespan. We used a computerised version of the SIQ-TR, using the open source software Limesurvey. The study was approved by the ethical committees of the University of Leuven and the psychiatric hospitals where the study was conducted.

RESULTS

DESCRIPTIVE STATISTICS

Most of our participants (69.81%) met more than five criteria needed for a BPD diagnosis (M = 6.38; SD = 1.18), with eight participants (15.09%) fulfilling at least eight

criteria. Additionally, the majority of our participants (69.92%) had one or more co-morbid Axis II disorders (*M* = 1.28; range: 0–4). The following Axis II disorders were most often diagnosed besides BPD: Obsessive-Compulsive PD (n = 14), Antisocial PD (n = 13), Paranoid PD (n = 13), and Narcissistic PD (n = 11).

AMT scores did not significantly differ between in- and outpatients, but outpatients reported significantly fewer recent, but not lifetime, NSSI behaviours compared to inpatients, M_{out} = 0.18, M_{in} = 1.05, F = 6.466, p = .014. Men and women did not differ from each other with respect to their scores on the variables of interest (AMT, SIQ-TR). Similarly, the setting from which participants were recruited was not associated with different scores on these variables either.

Table 20 summarises the means, standard deviations and scoring ranges of all variables derived from the AMT. In general, 86.91% of the retrieved memories was a specific memory. Table 21 shows the variables of interest derived from the SIQ-TR. Eighty-three percent of our participants engaged in NSSI in the past, which matches previous data on the occurrence of NSSI in BPD patients (e.g., Zaki, Coifman, Rafaeli, Berenson, &

Table 20 Descriptive statistics of the Autobiographical Memory Test (AMT)

	M	SD	Range
N / % specific memories	14.68 / .87	2.38 / .13	**7 – 18**
N / % general categorical memories	.92 / .05	1.14 / .07	**0 – 6**
N / % general extended memories	.42 / .02	.77 / .04	**0 – 4**
N / % no memory retrievals	.49 / .03	.93 / .06	**0 – 3**
N / % same event retrievals	.40 / .02	.63 / .04	**0 – 2**
N omissions	1.09	1.30	**0 – 6**

N = number of [type of answers on the Autobiographical Memory Test]; % = proportion of [type of answers on the Autobiographical Memory Test].

In computing %, we do not take into account omissions, e.g., % specific memories is = N specific memories / (18 – N omissions), with 18 being the total number of cues of the Autobiographical Memory Test.

Downey, 2013; Zanarini et al., 2008). Cutting is by far the most frequently used method of NSSI in our sample: Almost three-quarters of our participants (73.60%) cut themselves in the past, and about one third of our sample (32.08%) cut themselves during the past month. Of those patients who engaged in NSSI, thirty-three respondents (75.00%) reported to have been engaged in more than one method of NSSI (M = 2.26; SD = 1.65), with seven patients (15.91%) reporting having used all five proposed methods of NSSI in the past (Table 21).

Table 21 Frequencies and percentages of recent and lifetime NSSI, arranged by different NSSI methods, and by the number of different NSSI methods that were used during the period of interest

	Recent (during the last month)			**Lifetime Prevalence**		
N / % Scratching	13	/	24.5	30	/	56.6
N / % Bruising	9	/	17.0	23	/	43.4
N / % Cutting	17	/	32.1	39	/	73.6
N / % Burning	3	/	5.7	15	/	28.3
N / % Biting	4	/	7.5	13	/	24.5
N / % Total NSSI	28	/	52.8	44	/	83.0
0	25	/	47.2	9	/	17.0
1	16	/	30.2	11	/	20.8
2	8	/	15.1	11	/	20.8
3	2	/	3.8	8	/	15.1
4	2	/	3.8	7	/	13.2
5		-		7	/	13.2

NSSI = non-suicidal self-injury; N = number of [reported NSSI method]; % = percentage of respondents that reported [NSSI method].

THE RELATIONSHIP BETWEEN MEMORY SPECIFICITY AND NSSI

No differences in memory specificity were found between patients with a (recent or lifetime) history of NSSI and those without such a history (Table 22). Investigating the association between NSSI diversity and OGM, we found that recent NSSI diversity was not related to memory specificity in our sample (Table 23, above the diagonal). However, the more NSSI diversity during lifetime reported, the less general categoric memories were retrieved, r = -.34, p < .05. The positive association between the number of specific memories and lifetime NSSI diversity was marginally significant, r = .26, p = .06. Still, we found that more different methods of lifetime NSSI behaviours

Table 22 The mean numbers and proportions of specific and categoric memories retrieved by participants who reported lifetime or recent NSSI compared to those who did not

	Recent NSSI (n = 28)	**No recent NSSI (n = 25)**	***F***	***P***
N specific memories	15.07	14.24	1.626	.208
N categoric memories	.75	1.12	1.400	.242
% specific memories	.89	.84	2.456	.123
% categoric memories	.04	.07	1.406	.242
	Lifetime NSSI (n = 44)	**No lifetime NSSI (n = 9)**	***F***	***P***
N specific memories	14.73	14.44	.103	.749
N categoric memories	.84	1.33	1.402	.242
% specific memories	.87	.84	.490	.487
% categoric memories	.05	.08	1.228	.273

NSSI = non-suicidal self-injury; N = number of [specific/categoric] memories; % = proportion of [specific/categoric] memories.

In computing %, we do not take into account omissions, e.g., % specific memories is = N specific memories / (18 – N omissions), with 18 being the total number of cues of the Autobiographical Memory Test.

Table 23 Correlations between age, the number and proportions of specific and categoric memories, and the number of different recent and lifetime NSSI methods

	2	3	4	5	6	7
1. Age	-.37**	.35*	-.35*	.37**	-.25	-.42**
2. S	-	-.73**	.88**	-.76**	.17	.26$^{\$}$
3. GC	-.55**	-	-.84**	1.00**	-.18	-.34*
4. %S	.80**	-.71**	-	-.84**	.23	.31*
5. %GC	-.60**	.99**	-.70**	-	-.18	-.34*
6. N# NSSIs-R	.06	-.16	.16	-.14	-	.48**
7. N# NSSIs-LT	.10	-.28	.09	-.27	.41*	-

Correlations below the diagonal are controlled for age.

NSSI = non-suicidal self-injury; S = number of specific memories retrieved during Autobiographical Memory Test administration; GC = number of general categoric memories retrieved; %S = proportion of specific memories; %GC = proportion of general categoric memories; N# NSSIs-R = number of different non-suicidal self-injury methods used during the last month; N# NSSIs-LT = number of different non-suicidal self-injurious methods used in one's lifetime.

$^{\$}$ p = .06, * p < .05, ** p < .01.

related to higher proportions of specific memories, r = .31, p < .05. These associations thus suggest that NSSI diversity and OGM are inversely associated.

It should be noted, however, that both specificity and lifetime NSSI diversity are significantly associated with age. The older patients are, the less specific they are with respect to memory retrieval, and the fewer different NSSI methods they report having used during lifetime. We therefore re-analysed our data while controlling for age (Table 23, below the diagonal). Interestingly, all associations between NSSI diversity and memory specificity then disappeared.

DISCUSSION

This study examined the relationship between NSSI and OGM, two assumed affect-regulation strategies, in BPD. A first main finding was that OGM and NSSI diversity, and not presence of NSSI, were inversely related in our BPD patients. A second finding, qualifying the first, was that both OGM and NSSI diversity were associated with age and that their relation disappeared once age was controlled for. Three topics need further discussion: The relation between the findings of the present study and findings of previous studies, the inverse nature of the relation between NSSI and OGM, and the associations found with age.

Earlier studies on the association between OGM and NSSI in BPD patients exclusively focused on the *frequency* of NSSI behaviours (Maurex et al., 2010; Renneberg et al., 2010; Startup et al., 2001). Whereas Renneberg et al. (2005) and Maurex et al. (2010) did not observe any relation, Startup et al. (2001) found a negative association between the frequency of parasuicidal acts and OGM. In our sample, patients with and without NSSI did not differ from each other with respect to memory specificity. Therefore, we conclude that we were not able to replicate the findings of Startup et al. (2001) on the association between frequency of NSSI and OGM in BPD patients. Comparison, however, is difficult. Startup et al. (2001) studied 'generic memories', combining both categoric and extended memories[25], and they also included suicide attempts.

In addition to frequency of NSSI, we also examined OGM's relation with NSSI *diversity*. We found an inverse relation between these constructs, suggesting that NSSI diversity changes in function of OGM, and vice-versa. Thus, according to this balance-model, if one regulates one's affect mainly behaviourally, one is restricted in the allocation of

[25] In the present study, the patients with and without NSSI retrieved equal amounts of generic memories, *Welch's F*(1, 34.27) = 1.24, p = .27, and F(1, 51) = 1.99, p = .16, for recent and lifetime NSSI, respectively.

resources towards cognitive means. This may in part explain why BPD patients, who often engage in a variety of NSSI behaviours (Zanarini et al., 2008), only inconsistently show OGM. However, this model has some open ends. For instance, this model does not explain why exactly OGM and NSSI *diversity* fill up the scales of the balance. We would hypothesise that the functionality of NSSI diversity, compared to NSSI frequency, more strongly resembles that of OGM, but future research is needed to clarify these relationships. Additionally, further studies should also investigate the relation between other affect-regulation strategies (e.g., active coping, seeking support, etc.) and OGM as well. Furthermore, it is remarkable that OGM was associated with lifetime, but not with recent (during the past month) NSSI diversity. However, as displayed in Table 21, only 28 patients out of 53 (52.83%) engaged in NSSI during the past month, against 44 patients (83.02%) during lifetime. Reported NSSI diversity is also smaller when only considering a one-month period. For instance, 2 out of 28 patients (7.14%) who engaged in NSSI during the past month were engaged in three different methods, compared to 8 out of 44 patients (18.18%) who engaged in NSSI during lifetime. The operationalization of NSSI may be incomplete when we only consider a short period of time. On the flipside, these findings suggest that NSSI diversity (and OGM) refers to a long-term coping style. Finally, the balance-model does not explain why exactly someone 'chooses' one strategy (NSSI/OGM) above the other at a particular moment. It has been previously hypothesised (e.g., Linehan, 1993; Startup et al., 2001) that cognitive affect-regulation strategies in (hypervigilant) BPD patients may often be ineffective in dealing with emotional turmoil. According to Mark Williams (personal communication, 25/2/2014), executive resources, and the way they are allocated, may add to a better understanding of our findings. Guided search processes are hindered and slowed down when executive resources are reduced (Dalgleish et al., 2007), which is common in depressed (e.g., Hertel & Hardin, 1990), traumatised (e.g., Moradi, Taghavi, Neshat-Doost, Yule, & Dalgleish, 2000), and BPD patients (Maurex, 2009). Therefore, the chances for OGM are increased in these patients. In addition, it is assumed that resources are deployed to feverishly banish painful memories from

consciousness in order to reduce the impact of these memories on one's affect. When this strategy fails, intrusions emerge. However, in general, OGM comes as a side-effect of this 'affective gating' mechanism. It is hypothesised that affective gating fails in BPD patients, maybe because of hypersensitivity, extreme traumas, or a combination of both. Therefore, they will not show OGM. Moreover, their affect will fluctuate with whatever comes to mind, in valence, as well as in intensity. In an attempt to control these fluctuations, BPD patients may turn to behavioural affect-regulation strategies (NSSI, but possibly also alcohol, drugs, etc.).

Further analyses revealed that both memory specificity and lifetime NSSI diversity were negatively associated with age. Older respondents in our sample thus retrieve more categoric and less specific memories, and, remarkably, report to have engaged in less NSSI diversity. With respect to OGM's relation with age, our study replicates earlier findings (in BPD patients, e.g., Arntz et al., 2002; Spinhoven et al., 2007, but also in other clinical and non-clinical samples, e.g., Ros, Latorre, & Serrano, 2009; Sumner, Griffith, & Mineka, 2010). However, despite these findings, the age effect is only rarely acknowledged, and researchers not always control for age when investigating OGM. With respect to NSSI, frequency is known to decline with age (e.g., Zanarini et al., 2008). Our findings also suggest that older respondents would engage in fewer different NSSI methods than younger ones. A first possibility is that our findings reflect the general tendency to become more overgeneral when growing older. Being less specific, older respondents may differentiate less between different NSSI methods. Second, older patients may become less accurate in remembering the different methods they have been engaged in in the past. Indeed, as Startup et al. (2001) noted, measuring NSSI in retrospect may confound accuracy. Third, we may have coincidentally selected younger participants who on average used more methods than the older respondents we included (selection bias). Or, fourth, given the association between NSSI diversity and suicide (see our Introduction), and the high rates of suicide in BPD patients (up to 10%; APA, 2001), a natural selection bias may have occurred,

leaving only older participants with less variety in NSSI. Finally, it is possible that younger patients nowadays indeed use more NSSI methods compared to the older participants of our sample when they had the same age (cohort effect). Future longitudinal and prospective studies are recommended to clarify the negative association between age and NSSI diversity.

Interestingly, the association found between NSSI diversity and OGM disappeared when controlling for age, suggesting that age accounts for the association between lifetime NSSI diversity and OGM. One possible and fairly straightforward explanation for the observed correlation between NSSI diversity and OGM is that we have to do with a spurious correlation, caused by or resulting from the effect of a third variable, in this case age. However, the relation of both NSSI diversity and OGM with age could also indicate that affect-regulation skills in BPD patients change as these patients grow older, perhaps under the influence of therapy, or that they experience less pain in later stages of their lifes (see also, Zanarini et al., 2008). Indeed, given that a disturbed affect-regulation is a central feature of BPD, long-term follow-up studies suggest that up to 75% of BPD patients lose the BPD diagnosis after 15 years (Paris, Brown, & Nowlis, 1987). Referring to the affective gating hypothesis again, these findings suggest that BPD patients in the longer run will succeed in installing an affective gateway. We hypothesise that, given that ageing is naturally associated with more OGM, OGM will help to fulfil this process.

Our findings are not without limitations. First, by using the SIQ-TR, we only assessed a limited number of different NSSI methods, albeit the most common ones. Second, as mentioned already, NSSI was measured in retrospect, and therefore potentially not accurately. These shortcomings may be remediated in future studies by asking participants on a day-to-day basis during a consistent period of time to assess (and characterise) all NSSI methods they engage in. Given that we are the first to find an association between NSSI diversity and OGM in BPD patients, our findings need to be replicated, and future studies should challenge the proposed model, address the open

ends suggested above, and take age into account. However, these results, together with the previous findings on NSSI diversity, may be indicative of the potential importance of NSSI diversity in theorising and treatment.

Notwithstanding the listed limitations, this study was the first to demonstrate an association between NSSI diversity and OGM in BPD patients, suggesting that, given the high prevalence of NSSI in BPD patients, BPD patients use NSSI (behaviour) over OGM (cognition) as an affect-regulation strategy. Important to note, however, is that the relation disappeared when we controlled for age. As mentioned, this could simply mean that the relation that we observed between NSSI diversity and OGM is a spurious finding, caused by the variable age. Alternatively, results may suggest that BPD patients achieve other, more adaptive affect-regulation strategies when they get older, or that the adoption of NSSI as an affect-regulation strategy has changed over cohorts.

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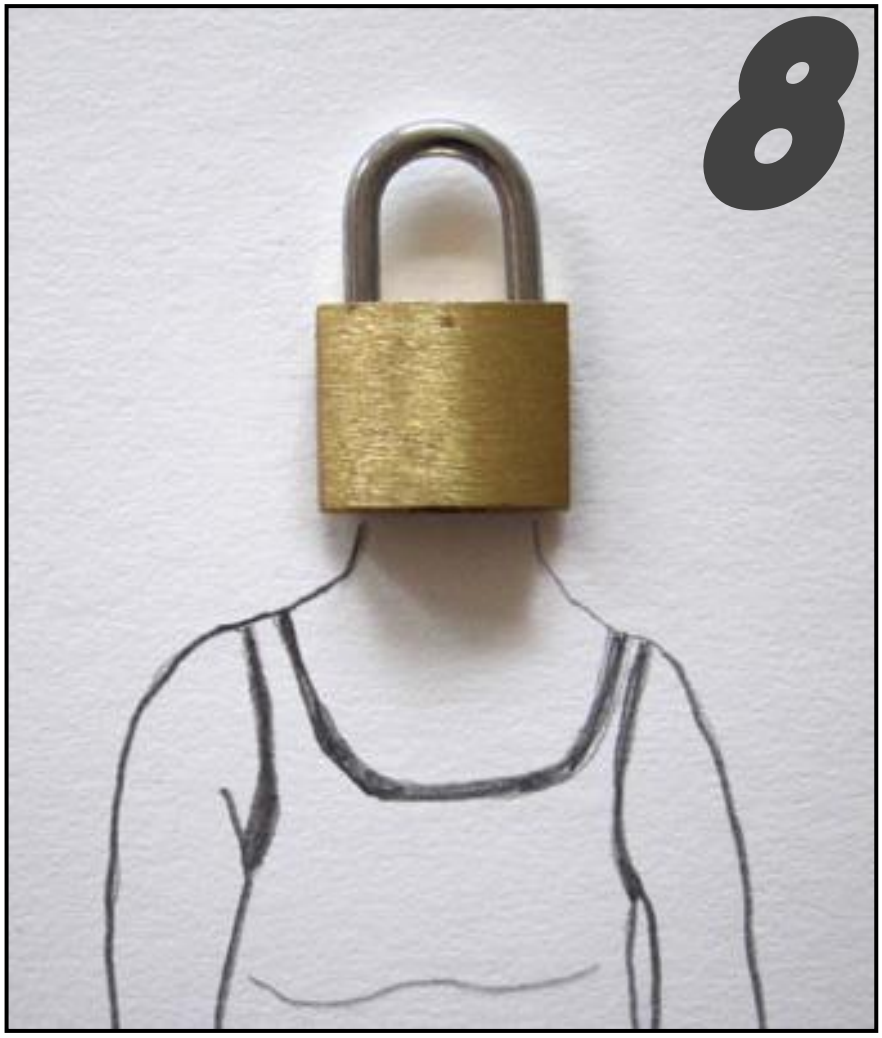

General Discussion

DISCUSSION OUTLINE

In this chapter, we will first give an overview of our findings with respect to each of the research aims we have outlined in the Introduction. While considering the strengths and limitations of our studies, we will interpret our findings against the background of previous studies. Subsequently, we will discuss the theoretical implications of our outcomes. Finally, we will discuss clinical implications and suggest directions for future research.

RESEARCH AIM 1: ENLIGHTENING THE ASSOCIATIONS BETWEEN OGM AND (MDD/PTSD IN) BPD

OGM in BPD is only inconsistently found (Chapter 2). Therefore, this thesis primarily aimed to get more insight into the associations between OGM and (co-morbid MDD and PTSD in) BPD. More specifically, we examined the following hypotheses (formulated in the Introduction, p. 13-14):

- OGM in BPD is associated with a co-morbid depressed state and/or depression symptom severity (Hypothesis 2[26]);
- OGM in BPD is associated with PTSD and/or trauma symptom severity (Hypothesis 3);
- OGM in BPD is associated with phenotypical BPD features (Hypothesis 4);
- OGM in BPD is related to a less favourable outcome on BPD symptoms, depressive symptoms and/or trauma symptoms (Hypothesis 5);

[26] Hypothesis 1 ('Autobiographical memory disturbances depend on the AMT cues used') fits our third research aim ('to further investigate the association between self-discrepancy and memory specificity, and to explore the association between self-discrepancy and vantage point during recall'). See p. 209 for the discussion of this research aim.

- Previously found associations between OGM and other variables in depressed and traumatised patients (e.g., rumination, avoidance, …), and BPD patients (e.g., age, education, …) are replicated in our studies (Hypothesis 6).

We will now address our findings with respect to each of these hypotheses.

SUMMARY OF FINDINGS

OGM in BPD is associated with a co-morbid depressed state and/or depression symptom severity (Hypothesis 2)

In general, OGM has been found to be associated with depressed state, rather than with depression severity (Williams et al., 2007). In both our BPD samples, we found no effect of depressed state on memory specificity (Chapter 3 and 4). In general our findings are in line with what was found by Maurex et al. (2010), Reid and Startup (2010), and Renneberg, Theobald, Nobs and Weisbrod (2005). However, they contradict the results of Kremers, Spinhoven, and van der Does (2004), who found that only currently depressed (BPD) patients were less specific than controls. Correspondingly, the regression analysis conducted by Arntz, Meeren, and Wessel (2002) suggests that MDD is more important than BPD in predicting OGM.

Depression severity was mostly found to be unrelated to OGM in BPD patients (Jones et al., 1999; Kremers et al., 2004; Kremers, Spinhoven, van der Does, & van Dyck, 2006; Maurex et al., 2010; Renneberg et al., 2005). Likewise, for our large clinical sample, no association was found between depression severity and the number of specific, r = -.14, nor categoric memories, r = .09, both ps > .32[27]. Our smaller clinical sample (Chapter 3), however, revealed a high and negative association between the scores on the Beck

[27] The correlations reported in Chapter 6, Table 16 (p. 147) were only computed on the respondents included in the regression analyses.

Depression Inventory-II (BDI-II; van der Does, 2002) and the proportion of specific, but not categoric memories. Furthermore, we found that the number (but not proportion) of specific memories predicted depression severity, but not depressed state at follow-up (Chapter 6). Yet, this contradicts the findings of Kremers et al. (2006). These authors, however, used a different AMT, that may have resulted in smaller proportions of specific memories (Griffith et al., 2012). Furthermore, time between T1 and T2 was longer (15 months), perhaps decreasing the predictive power of OGM (Sumner, Griffith, & Mineka, 2010).

Taken together, although depression severity is mostly found to be unrelated to OGM in BPD patients, our findings suggest that OGM is predictive for future depression severity. Furthermore, most findings now suggest that depressed state is not associated with higher levels of OGM in BPD patients.

OGM in BPD is associated with PTSD and/or of trauma symptom severity (Hypothesis 3)

In general, OGM has been found to be associated with the presence of trauma symptoms, rather than with trauma exposure per se (Moore & Zoellner, 2007). In BPD patients, no association between co-morbid PTSD and OGM has been found (Kremers et al., 2004; Renneberg et al., 2005). We also found that OGM in BPD patients is not related to a co-morbid diagnosis of PTSD (Chapter 4). In addition, matching the findings of Kremers et al. (2004), both the frequency of trauma-related intrusions and avoidance of memories or reminders of the traumatic events (both measured with the Impact of Event Scale, IES; Brom, Kleber, & Defares, 1986 – see also Table 25, p. 192) were not related to memory specificity when measured cross-sectionally. Thus, in contrast to non-BPD patients, these findings robustly show that OGM in BPD patients is unrelated to cross-sectionally measured PTSD (symptoms). However, we found that OGM predicted higher frequencies of trauma-related intrusions at six-month follow-up (Chapter 6).

OGM in BPD is associated with phenotypical BPD features (Hypothesis 4)

To our knowledge, none of the studies focusing on OGM in BPD reported on specific associations between BPD symptoms (or symptom clusters) and OGM. Yet, given the heterogeneity of the BPD diagnosis, these relations may be good candidates explaining the inconsistent findings with respect to OGM in BPD. We investigated this question in our large clinical BPD sample[28]. When age was co-varied, we found that the presence or absence of a criterion was never related to OGM.

We then examined the association between OGM and BPD symptom severity, reflected in the BPD trait score that was derived from the ADP-IV (Assessment of DSM-IV Personality Disorders, ADP-IV; Schotte, De Doncker, & Courjaret, 2007). Each of the 94 ADP-IV statements represents a personality disorder criterion, and respondents are asked to indicate to what extent they agree with each of the statements, ranging from 1 (*totally disagree*) to 7 (*totally agree*). Higher scores indicate higher levels of symptom severity. The total BPD trait score is the average of the 10 BPD-relevant items. This score was found to be unrelated to memory specificity when age was controlled for. Finally, based on the work of Sanislow et al. (2002), we used the ADP-IV items to create severity scores for each of the factors that underlie a BPD diagnosis (disturbed relatedness, affective and behavioural dysregulation). None of these dimensions was significantly associated with the measures of memory specificity. Thus, our findings suggest that neither the presence of specific BPD symptoms nor BPD symptom severity is associated with OGM.

[28] Analyses on the association between BPD symptom (severity) and the autobiographical memory disturbances of interest (see also pp. 203-204) have not been reported in any of the previous chapters.

Table 24 Variance in memory specificity in different samples

	%S	%GC	Based on
Borderline patients	.59 - .77	.13 - .22	Kremers et al. (2004); Maurex et al. (2010); Reid & Startup (2010); Renneberg et al. (2005); Van den Broeck, Claes, Pieters, & Raes (2012 – Chapter 3)
Depressed / traumatised patients	.54 - .76	.11 - .40	Andersson, Hesser, Cima, & Weise (2013); Belcher & Kangas (2014); Graham, Herlihy, & Brewin (2014)*; Hermans et al. (2008); Kleim & Ehlers (2008); McBride, Segal, Kennedy, & Gemar (2007); Sutherland & Bryant (2007)*; Watkins & Teasdale (2004); Watkins, Teasdale, & Williams (2000)
Non-clinical controls	.54 - .93	.06 - .12	Andersson et al. (2013); Belcher & Kangas (2014); Kremers et al. (2004); Maurex et al. (2010); Reid & Startup (2010); Renneberg et al. (2005)

%S = proportion of specific memories retrieved at the AMT; %GC = proportion of categoric memories retrieved at the AMT.

* refers to studies in patients with PTSD.

Solely based on our own work, it is impossible to conclude on the association between OGM and a diagnosis of BPD, because we never included control groups in our studies. Reviewing the literature, we compiled Table 24, which lists information about the proportions[29] of specific and categoric memories retrieved by BPD patients, depressed and traumatised patients, and non-clinical controls. The proportion of specific and categoric memories largely vary across study, probably because of the use of different AMTs (Griffith et al., 2012) in samples differing with respect to many sample characteristics (in-/outpatients, gender, age, depressive episodes in the past, …). Yet, although this variation may compromise comparability, these data suggest that BPD

[29] As reported in Chapter 2, memory specificity is not always reported in terms of the *proportion* of specific and/or categoric memories. Yet, the papers included in Table 24 all provide all information necessary to compute these figures.

patients retrieve slightly more categoric memories than non-clinical controls. Compared to clinical controls, BPD patients' retrieval of categoric memories is situated in the lower end of the range. With respect to the proportion of specific memories, no important differences are found between groups. Indeed, like Reid (2008), we conclude that BPD patients do not display overgeneral memory to the extent observed in depressed and traumatised patients. Further studies, however, are necessary, comparing BPD patients, other clinical and non-clinical controls in one and the same study.

In our large BPD sample, we found that %S = .86, and %GC = .06. These proportions strongly differ from what is generally found in BPD patients (see Table 24). Rather, they match what is found in non-clinical controls. One possible explanation is that we allowed participants to search for memories for 60s, giving them more time to come up with specific memories than, for instance, Maurex et al. (2010; 30s) whose study is most comparable to ours with respect to sample size and AMT format (adjectives, only verbally presented). In addition, given that the experimenter was not blind for the purposes of the study, demand characteristics may have influenced the results.

<u>OGM in BPD is related to a less favourable outcome on BPD symptoms, depressive symptoms, and/or trauma symptoms (Hypothesis 5)</u>

As mentioned above and reported in Chapter 6, we found that memory specificity predicts the frequency of trauma-related intrusions at six-month follow-up, and to a lesser extent, future depression severity. OGM was not predictive for future depressed or traumatic state. With respect to BPD, we found no associations between measures of memory specificity at T1 and diagnostic state/symptom severity at T2. We already hypothesised that it is useful for BPD patients to learn how to get more specific while retrieving memories, given that our findings suggest that OGM in BPD may be clinically relevant in order to mitigate the course of depression and/or PTSD.

Previously found associations between OGM and other variables (socio-demographics and process variables) are replicated in our studies (Hypothesis 6)

To better understand OGM, researchers have investigated its associations with both socio-demographic and process variables, both in BPD and in non-BPD participants. We investigated whether these associations could be replicated in our clinical BPD samples.

As outlined in Chapter 2, OGM in BPD has not been found to be associated with gender (Arntz et al., 2002; Kremers et al., 2004) or marital status (Arntz et al., 2002). Age was sometimes found to be negatively correlated with memory specificity (Artnz et al., 2002; Maurex et al., 2010; and Spinhoven, Bockting, Kremers, Schene, & Williams, 2007, when cue discrepancy was taken into account), but not always (Kremers et al., 2004; Renneberg et al., 2005). Education (in terms of years or level of education) was found to correlate positively with memory specificity (Arntz et al., 2002; Maurex et al., 2010), or negatively with OGM (Spinhoven et al., 2007). In our large clinical BPD sample we found that memory specificity was not related with gender, marital status, or education (in terms of years and level of education). However, we found that both the number of specific and categoric memories were significantly associated with age (see also Chapters 4 and 7). The older the patients were, the less specific and the more categoric memories they retrieved. We already stressed the importance of this association in Chapter 7. Finally, as suggested in Chapter 2, we examined whether or not OGM was affected by the patient's medication use. We found that the use antipsychotics, antidepressants, nor benzodiazepines was related to OGM.

Furthermore, OGM in BPD has also been studied in relation to other (process) variables that have been found to be associated with OGM in depressed and traumatised samples (e.g., rumination, avoidance measures, executive functioning). As is shown in

Table 25 Correlations between measures of memory specificity and variables operationalising potentially underlying processes (CaR-FA-X), and dissociation in 54 BPD patients, partialled out for age

	S	GC
Ruminative Response Scale (RRS)		
Total score	-.09	.03
Brooding	.03	-.19
Reflection	-.22	.25
Impact of Event Scale (IES)		
Total score	-.09	.06
Intrusions	-.06	.06
Avoidance	-.10	.04
White Bear Suppression Inventory (WBSI)*	.01	-.01
Acceptance and Action Questionnaire-II (AAQ-II)*	.06	-.03
Letter-Number Sequencing subtest of the Wechsler Adult Intelligence Scale-III (WAIS III-LNS; estimation of executive capacity)*	.13	.04
Dissociation Questionnaire (DIS-Q)*		
Total score	-.14	.18
Identity confusion	-.17	.14
Loss of control	-.06	.11
Amnesia	-.17	.26
Absorption	.09	-.02

S = number of specific memories; GC = number of categoric memories.

AAQ-II (ACTIntervisie groep, 2006); DIS-Q (Vanderlinden, van Dyck, Vertommen, Vandereycken, & Verkes, 1993); IES (Brom et al., 1986); RRS (Raes & Hermans, 2007); WAIS III (Wechsler, 2000); WBSI (Muris, Merckelbach, & Horselenberg, 1996).

* See Appendix B, p. 236, for a description of these measures.

Table 25[30], we found no associations between memory specificity and measures of rumination, experiential avoidance/acceptance, and an estimation of executive functioning, all partialled out for age and computed in our large clinical BPD sample. Also, we found no associations between memory specificity and avoidance of trauma-related memories or reminders (IES; discussed above in this chapter and in Chapter 6). We did not replicate the findings of Maurex et al. (2010), who found a positive correlation between memory specificity and executive functioning in BPD patients. Also, in our smaller clinical sample (Chapter 3), we found that memory specificity correlated with rumination. However, this association disappeared when we controlled for depression severity.

Finally, OGM in BPD has been studied in relation to several borderline-related symptoms that have been thought to have affect-regulating functions (e.g., dissociation, parasuicidal acts). We found no association between measures of memory specificity and dissociation (Table 25). However, as reported in Chapter 7, we found that NSSI diversity, but not presence, was negatively associated with reduced memory specificity – but this correlation disappeared when we controlled for age.

In sum, because we found no associations between the CaR-FA-X process variables and measures of memory specificity, our data seem to question the applicability of the CaR-FA-X model to BPD patients. This supports the conclusions we draw in Chapter 2 following a review of the literature on OGM in BPD. Furthermore, age seems important. It has repeatedly been shown now that OGM is more likely in older (BPD) patients. Finally, we found an interesting association between NSSI diversity and OGM (that should be replicated in order to exclude it is a spurious association).

[30] These correlations have not been reported yet in any of the previous chapters.

THEORETICAL CONSIDERATIONS

Taken together, we conclude that a co-morbid diagnosis of PTSD in BPD patients is robustly shown to be unrelated to OGM. Furthermore, the majority of findings now suggests that MDD in BPD is also unrelated to OGM. Yet, memory specificity was found to predict future depression severity and – more robustly – the frequency of trauma-related intrusions. OGM has not been found to be associated with the presence of BPD criteria, nor with BPD symptom (cluster) severity. And finally, associations between the CaR-FA-X process variables and OGM in BPD patients are few and inconsistent.

To explain the inconsistent associations between OGM and MDD in BPD patients, several accounts may be put forward. Perhaps OGM in these patients fluctuates with the affective state they are in. Future studies may therefore include measures of affect before (and perhaps also after) AMT administration. Or, as argued in Chapter 3, maybe depression in BPD patients differs in nature from depression in MDD. For instance, if depression in BPD results from affective instability, resources may be intact, making OGM less likely. The current instruments to assess depressed state may insufficiently distinguish between these types of depression.

Furthermore, the predictive value of OGM for future complaints in BPD patients would fit the idea of OGM as a vulnerability factor in BPD as well. Yet, these findings need replication and further investigation.

OGM has often been considered as an affect-regulation strategy (e.g., Chapter 7). All findings on OGM in BPD patients combined, seem to suggest that BPD patients generally do not use OGM as a steady affect-regulation (coping) strategy as described in the CaR-FA-X model. We have argued that BPD patients may disregard self-stabilising processes, leaving them with enough resources to come up with specific memories (Chapter 4), or that they opt for other strategies to regulate their affect (e.g., vantage perspective, Chapter 4, or NSSI diversity, Chapter 7). Moreover, findings rather suggest that the CaR-FA-X model seems generally less well applicable for explaining OGM in BPD. Yet, BPD patients ruminate (even more than depressed patients; Abela, Payne, &

Moussaly, 2003), but it seems that they do not get captured in ruminative processes to the same extent as depressed patients do. Also, with respect to functional avoidance (FA), it is unclear whether BPD patients, who are characterised by an unstable sense of self and get easily overwhelmed by intense emotions, use OGM at all as a strategy to preserve self-coherence. At least, findings suggest OGM does not generalise towards other memories in BPD patients as it does in depressed patients. Why do BPD patients, who are good candidates for showing (more) OGM given the history of depressive episodes and trauma they often have, show this pattern of results? Differences between depressed and BPD patients, particularly due to the nature of BPD, may influence information processing, and are therefore interesting variables to consider when attempting to explain these findings. We will now turn to some theoretical considerations on the potential role of executive functioning, and differences in affect-regulation and identity in explaining this pattern of findings.

The potential role of executive functioning

According to Reid and Startup (2010), education could be considered as a rough estimate of executive functioning. Higher levels of education have repeatedly been shown to be associated with the retrieval of more specific (Arntz et al., 2002; Maurex et al., 2010; Reid & Startup, 2010), or less categoric memories (Spinhoven et al., 2007, study 2) in BPD patients – but we did not replicate these findings in our large clinical BPD sample. Yet, to our knowledge, only Maurex et al. (2010) properly investigated the association between executive functioning and OGM in BPD patients. They administered the Block Span Backward test. In this task, the examiner pointed to consecutively longer series of blocks, seemingly randomly organised at a white board. Respondents had to point to the blocks in the reversed order. Better outcome this task was associated with the retrieval of more specific memories in BPD patients. Unfortunately, we neglected to include a visual working memory task. We did, however, administered a verbal working memory task, the Letter-Number Sequencing

(LNS) Subtest of the WAIS-III (Wechsler, 2000 – see Appendix B, p. 236, for more information on this task). Performances on this task were not associated with measures of memory specificity. This matches the findings of Maurex et al. (2010), who also administered the Digit Span Task of the WAIS-revised (Wechsler, 1981), another verbal working memory task that strongly resembles the LNS.

Thus, given that the role of executive functioning is only limitedly studied in relation to OGM in BPD, and given that executive resources in BPD patients are depleted (e.g., Maurex, 2009), perhaps the limitedly increased proportion of categoric memories in BPD patients could be explained by the association between OGM and (visuospatial) executive functioning. This, however, does not explain why OGM in BPD patients is rather unrelated to rumination and avoidance measures.

The potential role of differences in affect-regulation

In Chapter 2, we already briefly discussed emotional dysregulation in this regard, one of the core factors underlying BPD. In line with Linehan (1993), we suggested that BPD patients may lack the cognitive mechanisms (as OGM) to alter the psychological distance towards emotional memories. Also, Williams (Chapter 7) argues that affective gating in BPD patients fails due to their hypersensitivity, but no further explanation is provided by which we could comprehend the absence of the CaR (Capture and Rumination) account in BPD patients. In their Emotional Cascade Model (ECM), Selby and Joiner (2009) expand on rumination as a potential factor underlying emotional dysregulation in BPD patients. They argue that, although rumination in general has been shown to magnify negative affect as well as to increase its duration, the intensity of the affect it evokes is larger in BPD patients than in MDD patients. In addition, it is assumed that emotional intensity will build up, as long as rumination proceeds. According to associative network models of information processing (e.g., Bower, 1981), the intensity of one's emotions may add to successful retrieval of mood-congruent memories. Somewhat consistent with this idea, Talarico, LaBar, and Rubin (2004) found

that emotional intensity ratings of AMT cues significantly predicted memory specificity in undergraduate students. The ECM further states that normally effective strategies (cognitive reappraisal, distraction) may not be distractive enough for BPD patients to dampen their affect. Instead, they are likely to turn to physical sensations, such as NSSI of substance use. These strategies interfere with the ruminative processes, and halt "the build-up and intensity of negative emotions, allowing these emotions to subside because attention is no longer on emotions" (Selby & Joiner, 2009, p. 221). This line of reasoning would relate to inhibitory dysfunction (Domes et al., 2006), or heightened levels of impulsivity in BPD patients (e.g., Claes, Vertommen, Smits, & Bijttebier, 2009).

The potential role identity disturbance

Taking a closer look at the components of the CaR-FA-X model, we notice that both the CaR and the FA component are bound to one's self-concept. With respect to CaR, rumination has been conceptualised as a strategy to cope with self-discrepant information (e.g., Martin & Tesser, 1989, Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). The FA component describes how processes aimed to maintain or stabilise one's current self (self-coherence) become active when self-discrepant information threatens to become activated. Thus, in order for these processes to negatively influence memory specificity, the model assumes the presence of a rather stable, well-defined, and elaborated self-concept, when confronted with highly self-discrepant information.

The self-concept of BPD patients has been described as unstable (e.g., Coolidge, Thede, & Jang, 2001; Jørgensen, 2009), disorganised (e.g., Bateman & Fonagy, 2006), discontinuous (e.g., Fuchs, 2007), fragmented (e.g., Fuchs, 2007; Livesely, 1998), not fully integrated (e.g., Fuchs, 2007), incoherent (e.g., Fuchs, 2007; Wilkinson-Ryan, & Westen, 2000), incongruous (Parker, Boldero, & Bell, 2006), and inconsistent (e.g., Livesely, 1998; Wilkinson-Ryan & Westen, 2000). It has been argued that BPD patients lack self-clarity (Bloch & Singh, 1994; Livesely, 1998), self-certainty (Livesely, 1998), self-complexity (i.e., BPD patients have few and poorly elaborated higher-order self-

schemas; Gardner, 1997; Parker et al., 2006), and concrete self-boundaries (Livesely, 1998). Finally, these characteristics of the self may compromise the formation of one's autonoetic awareness (i.e., experiencing one's identity as constant over time and across situations; Fuchs, 2007), one's goals (Bloch & Singh, 1994; Fuchs, 2007), one's self-directedness (e.g., Cloninger, Svrakic, & Przybeck, 1993), and one's sense of agency and autonomy (Bateman & Fonagy, 2006; Fuchs, 2007; Livesely, 1998). Despite the diverse terminology that has been used to describe the BPD self-concept, it is clear that there is a consensus in the literature that the self-concept of BPD patients fundamentally differs from that of, e.g., depressed and traumatised patients without BPD. We speculate that (some of) these differences might contribute to the observation regarding OGM in BPD patients.

Although problems regarding the self-concept reported by BPD patients are situated at the content level (e.g., dysfunctional schemas, Young, Klosko, & Weishaar, 2003), as well as at the functional level (e.g., NSSI as an affect-regulating strategy), the terminology used to distinguish the BPD self-concept from a non-BPD self-concept suggests that BPD patients primarily have problems regarding structural aspects of the self-concept (Livesley, 1998). The structural development of one's self-concept, however, starts at the content level, with experiences, and in constant interaction with one's environment and significant others (Bateman & Fonagy, 2007; Beck, 1967; Conway et al., 2004; Linehan, 1993; Young, 1990; Young et al., 2003). Very young children coincide with their environment, but they gradually learn to categorise their experiences, and to integrate ('structure') all self-knowledge into one's self-concept ('content'; Shavelson, Hubner, & Stanton, 1976), at least when their experiences and interactions demonstrate consistencies in one's behaviour, attitudes or thoughts (Conway et al., 2004). At an early age, these processes need to be supported by significant others. These significant others should mirror (Bateman & Fonagy, 2006) and validate (Kellogg & Young, 2006; Linehan, 1993) the infants' internal states, in order to facilitate the development of experiential representations that will contribute to the

development of the infant's self-concept, both in content and in form. Attachment figures who are unable to properly mirror the infant's internal states (Bateman & Fonagy, 2006), or unpredictable (violent) environmental circumstances during childhood (Linehan, 1993; Young et al., 2003), perhaps in combination with a biological vulnerability for emotional dysregulation (Linehan, 1993), hinder the processes necessary to develop steady self-schemas (e.g., clustering/categorising self-relevant information). More specifically, BPD patients are thought to essentially have problems "to create, maintain and use benign and integrated internal images of self and others" (Bender & Skodol, 2007, p. 501 – see also Judd & Ruff, 1993, for psychometric support for the idea that BPD patients have difficulties integrating information).

In terms of Conway et al. (2004), we reason that BPD patients may be able to cluster their episodic information in the layers of the autobiographical knowledge base, but they fail – because they have not acquired the skills? – to crystallise ('integrate') these pieces of information into a distinct self-concept, unifying both positive and negative aspects, sometimes hiding one for another. As a result, we hypothesise that they have a fragmented self-concept, consisting of different, mostly poorly elaborated 'current' self-concepts, that are activated in turn, dependent on the context one is in, or the people one is with (see also, e.g., Materson & Klein, 1989; Kernberg et al., 1989). Therefore, the BPD self is experienced as unstable, incoherent, and discontinuous, and BPD patients are considered as impulsive and affective instable. Switching self-concepts, though, may be considered a strategy to preserve the present fragile structure, because it potentially is an adaptive response to self-discrepant experiences. In the context of interpersonal relationships, Fuchs (2007, p. 379) puts it like this: "The temporal fragmentation of the self avoids the necessity of tolerating the threatening ambiguity and uncertainty of interpersonal relationships." With poorly elaborated schemas and little self-coherence to preserve, we could expect the influence of the CaR and the FA component of the CaR-FA-X model to be limited. We further speculate that

dealing with diverse self-concepts may absorb important amounts of resources, having an impact on guided search processes.

Although switching self-concepts can modulate emotional input into the system, Putnam and Silk (2005, p. 905) argue that "[cognitive change and attentional deployment] also occur simultaneously with or after the presentation of an affective [self-discrepant] stimulus". When severely distressed, the violence of the evoked emotions may not be comprehended by the poorly elaborated activated self-concept. Behavioural strategies then, like, for example, non-suicidal self-injury (NSSI), are used to 'reset' one's affective state (Bateman & Fonagy, 2006; Linehan, 1993). Indeed, NSSI diversity was found to be negatively associated with OGM.

However, both NSSI diversity and OGM were associated with age, and when we controlled for age, their association disappeared. We therefore hypothesise that BPD patients make progress, and their self-concept may get more integrated and/or their emotional intensity decreases or they learn how to deal with it better, as they grow older. This would also match the findings that BPD patients may succeed in overcoming the diagnosis (Zanarini et al., 2008). Alternatively, older BPD patients may show higher levels of OGM because experiences are more rehearsed.

Although these considerations are highly speculative, we believe that research on autobiographical memory, which is assumed to be strongly associated with one's self-concept, would benefit from the inclusion of measures of emotional dysregulation, self-structure, and/or the ability to integrate information (see also: Directions for future research).

RESEARCH AIM 2: BROADENING THE KNOWLEDGE ON VANTAGE PERSPECTIVE DURING RECALL (IN BPD)

With respect to the point of view one adopts (vantage perspective) during autobiographical recall, an overarching theoretical framework explaining its functions and mechanisms is not currently available. However, parallels with OGM seem obvious. Furthermore, to our knowledge, vantage perspective during recall has never been investigated in BPD patients. Therefore, the second aim of this thesis was to shed a light on the occurrence and relations of vantage perspective in BPD patients. In analogy with OGM, we now investigated the following hypotheses:

- As in non-BPD participants, vantage perspective during recall in BPD is associated with a co-morbid depressed state and/or depression severity (Hypothesis 2);
- As in non-BPD participants, vantage perspective during recall in BPD is associated with PTSD and/or trauma symptom severity (Hypothesis 3);

We further explored the following statements:

- Vantage perspective during recall in BPD is associated with phenotypical BPD features (Hypothesis 4 - exploratory);
- Vantage perspective during recall in BPD is related to a less favourable outcome on BPD symptoms, depressive symptoms and/or trauma symptoms (Hypothesis 5 - exploratory);
- Vantage perspective during recall in BPD is associated with socio-demographic and process variables (Hypothesis 6 - exploratory).

SUMMARY OF FINDINGS

As in non-BPD participants, vantage perspective during recall in BPD is associated with a co-morbid depressed state and/or depression symptom severity (Hypothesis 2)

Non-BPD depressed participants show higher proportions of observer memories (Bergouignan et al., 2008; Lemogne et al., 2006). We hypothesised more observer

memories in (remitted) depressed BPD patients as well. Our data, however, refuted this hypothesis (Chapter 4). Also, depression severity (BDI-II; van der Does, 2002) is found to be unrelated to the proportion of observer memories retrieved in our large clinical BPD sample, r = -.20, p = .247. This is in line with the findings of Kenny and Bryant (2007) in trauma-exposed individuals, but contradicts the results from Lemogne et al. (2009) and Kuyken and Moulds (2009) in healthy and remitted depressed respondents, respectively. Finally, also contradicting the findings of Kuyken and Moulds (2009), we found that the proportion of observer memories was not predictive for future depression symptom severity in our large clinical sample.

<u>As in non-BPD participants, vantage perspective during recall in BPD is associated with PTSD and/or trauma symptom severity (Hypothesis 3)</u>

In our large clinical BPD sample, we found that (a) relatively few traumatic memories were retrieved in response to AMT cues; and (b) that most of these memories were retrieved while adopting an observer perspective (Chapter 4). The latter finding is in line with what has been found in non-BPD participants (e.g., Berntsen, Willert, & Rubin, 2003). Moreover, we have shown that BPD patients with PTSD more often adopt an observer perspective during recall than BPD patients without PTSD, also for non-traumatic memories. These findings, however, should be interpreted with caution (see p. 106 for critical remarks given the Type I errors that may occur due to multiple analyses).

Whereas in non-BPD participants (levels of) observer memories were mostly found to correspond with more trauma-related avoidance behaviour (Berntsen et al., 2003; Kenny & Bryant, 2007; Porter & Birt, 2001), McIsaac and Eich (2004) failed to replicate these findings. Sometimes, avoidance measured with the IES (Brom et al., 1986) predicted only the number of negative field memories (Lemogne et al., 2009), or was only associated with more observer memories in the most depressed subsample (Williams & Moulds, 2007). In the total sample of BPD patients of our large clinical

study, we found that none of the IES scales was associated with vantage perspective (see also Table 26, p. 205). Yet, exploring these associations in the PTSD subsample (n = 10) of our large clinical BPD trial, we found that higher proportions of observer memories were associated with less avoidance, r = -.66, p < .035[31,32]. This contradicts most of the findings in non-BPD participants. Finally, contradicting the findings of Kenny et al. (2009), we found that the proportion of observer memories retrieved at baseline was not associated with neither a diagnosis of PTSD (SCID-I; van Groenestijn, Akkerhuis, Kupka, Schneider, & Nolen, 1999) nor trauma symptom severity (IES) at follow-up.

Thus, a co-morbid diagnosis of PTSD is associated with higher levels of observer memories in BPD patients, also when recalling non-traumatic memories. Furthermore, and although replication in larger samples is necessary, our findings suggest that the retrieval of observer memories in BPD patients with PTSD corresponds with less avoidance towards trauma-related thoughts and stimuli.

Vantage perspective during recall in BPD is associated with phenotypical BPD features (Hypothesis 4 - exploratory)

We explored whether vantage perspective during recall was associated with specific BPD criteria (SCID-I; van Groenestijn et al., 1999), and with the total BPD trait score, and the symptom severity scores on each BPD factor, derived from the ADP-IV (Schotte et al., 2007). These analyses revealed no significant associations.

As outlined in Chapter 4 (p. 102), the proportion of observer memories in our large clinical BPD sample is relatively high compared to what has been found in trauma

[31] These findings have not been reported in any of the previous chapters.

[32] Nonetheless, we found that patients with PTSD scored significantly higher on all IES dimensions than the non-PTSD patients.

survivors (Kenny & Bryant, 2007), recurrent depressed adults (Kuyken & Moulds, 2009), and adolescents with and without MDD and/or PTSD (Kuyken & Howell, 2006). Despite the absence of a non-BPD control group, these findings may suggest that BPD patients in general more often adopt an observer perspective compared to other clinical (Kenny & Bryant, 2007; Kuyken & Moulds, 2009) and non-clinical control groups (Kuyken & Howell, 2006), independent of BPD symptom severity. Replication, however, in a design with both BPD and non-BPD participants, is necessary because, to our knowledge, we are the first to explore perspective taking during recall in BPD patients.

Vantage perspective during recall in BPD is related to a less favourable outcome on BPD symptoms, depressive symptoms and/or trauma symptoms (Hypothesis 5 - exploratory)

We already mentioned that the correlations between the proportion of observer memories at T1 and (the subscales of) the IES (Brom et al., 1986) and the BDI-II (van der Does, 2002) at T2 are all non-significant in our large clinical trial. Likewise, we found no association between the proportion of observer memories retrieved at baseline and BPD symptom severity (ADP-IV; Schotte et al., 2007) at follow-up. Finally, no associations were found between the initial proportion of observer memories and depressed, trauma, or BPD state at follow-up. However, because we did not measure vantage perspective during autobiographical memory retrieval from the beginning, these associations were computed over only 21 to 24 respondents. Perhaps our data have not enough power to observe the expected effects.

Vantage perspective during recall is associated with socio-demographic and process variables (Hypothesis 6 - exploratory)

Vantage perspective during recall has also been studied in relation to other variables, albeit to a lesser extent than OGM. Rice and Rubin (2009) found that women more often retrieved observer memories than men, but we were not able to replicate this.

Table 26 Correlations between vantage perspective during recall (%O) and variables operationalising potentially underlying processes and dissociation in 34 BPD patients

	%O
Ruminative Response Scale (RRS)	
Total score	.11
Brooding	-.02
Reflection	.14
Impact of Event Scale	
Total score	.19
Intrusions	.21
Avoidance	.12
White Bear Suppression Inventory (WBSI)*	.11
Acceptance and Action Questionnaire-II (AAQ-II)*	-.09
Letter-Number Sequencing subtest of the Wechsler Adult Intelligence Scale-III (WAIS III-LNS; estimation of executive capacity)*	.04
Dissociation Questionnaire (DIS-Q)*	
Total score	-.23
Identity confusion	-.12
Loss of control	-.23
Amnesia	-.48
Absorption	.45

%O = proportion of observer memories

AAQ-II (ACTIntervisie groep, 2006); DIS-Q (Vanderlinden et al., 1993); IES (Brom et al., 1986); RRS (Raes & Hermans, 2007); WAIS III (Wechsler, 2000); WBSI (Muris et al., 1996).

* See Appendix B, p. 236, for a description of these measures.

When retrieving traumatic memories, (younger) high school students were found to more often adopt an observer perspective than psychology students (Berntsen et al., 2003). In our non-clinical samples, we found negative associations between the proportion of observer memories on the one hand, and educational level, *r* = -.21 (Koolen, 2012), and age, *r* = -.26 (Reza, 2011) on the other hand. Also, according to our data, vantage perspective was not affected by the use of psychopharmacological drugs (antipsychotics, antidepressants, benzodiazepines).

Relations with other variables are only limitedly reported. Associations between the number of observer memories and performances on rumination questionnaires are inconsistent (Williams & Moulds, 2007 vs. Kuyken & Moulds, 2009). No association was found with the White Bear Suppression Inventory (WBSI; Murris et al., 1996 – see Appendix B, p. 236, for more information on this questionnaire), a measure of experiential avoidance (Williams & Moulds, 2007). Although the vantage perspective of trauma-related memories was not associated with the levels of dissociation reported (Cooper, Yuille, & Kennedy, 2002), Williams and Moulds (2007) found that the proportion of observer memories retrieved by students corresponded with higher levels of numbness and detachment. Table 26[33] displays the cross-sectional associations between the proportion of observer memories and the process variables of interest as computed in our large BPD sample. After Bonferroni corrections, no significant associations were maintained.

THEORETICAL CONSIDERATIONS

In sum, depressed state was not found to affect vantage perspective during recall in BPD patients. As for OGM, this does not exclude the possibility that vantage perspective

[33] These correlations have not been reported yet in any of the previous chapters.

is affected by the affective state of the participant at the time of testing. In contrast, as in non-BPD participants, we found that, although only few traumatic memories were retrieved in response to the AMT, most of these memories were retrieved while adopting an observer perspective. In addition, we found that BPD patients with PTSD more often adopt an observer perspective, also for non-traumatic memories. This may suggest that BPD patients with PTSD adopt a (generalised) observer memory retrieval style which serves an affect-regulating (coping; functional avoidance) function.

Holmes and Mathews (2010) suggest that processing a reconstructed imagery memory will result in more emotionality than processing a verbal representation, because imagery largely overlaps the original event. Thus, in case of traumatic memories, avoidance of images is probably more useful than avoiding descriptions, that are already less emotional in nature. However, contrary to what could be expected, post-hoc analyses in the small subsample of BPD patients with PTSD (n = 10) revealed a strong but negative association between the proportion of observer memories retrieved and IES-Avoidance. Although replication is necessary, one way to interpret these findings is to assume that observer memories in BPD patients with PTSD dampen the intensity of one's emotions, making it easier in the short term to talk about the traumatic events, or to go to places associated with them. This matches the opinion of Kross and co-workers (Kross & Ayduk, 2009; Kross, Ayduk, & Mischel, 2005), who state that a distanced perspective that reduces emotional reactivity is beneficial for clinical populations to stay in contact with emotionally evocative material (see also Wisco & Nolen-Hoeksema, 2011). Alternatively, the adoption of an observer memory may be merely symptomatic for PTSD (with BPD).

Yet, in the total sample of our large BPD trial, we found no associations between vantage perspective during recall on the one hand, and measures of (experiential) avoidance measures (IES, WBSI, AAQ) and dissociation (DIS-Q) on the other hand. Therefore, we do not think observer memories in BPD patients in general serve affect-regulation. Given that the current findings seem to suggest that BPD patients in general

retrieve high proportions of observer memories in response to AMT cues compared to other samples, and keeping in mind our expansions on the fragmented self-concept of BPD patients in the theoretical section on OGM, we could speculate that BPD patients, stimulated by the distress caused by one's affective instability, are motivated to develop a unified self-concept. Libby and Eibach (2002) supported the assumption that vantage perspective during recall results from an 'on-line judgement' of the discrepancy between the recalled event and one's present self-concept (see also Kuyken & Moulds, 2009). It could be argued that BPD patients use observer memories in order to search for similarities between different self-concepts, or in an attempt to enlarge their sense of autonoetic awareness. Similar strategies may be hypothesised in adolescents, who are in a critical phase to build their self-concept (Kuyken & Howell, 2006). We further speculate that BPD patients may lack the abilities to go beyond the first step of comparison (by means of an observer perspective) to the second step of successfully processing the similarities and differences (by means of a field perspective). Indeed, BPD patients have low levels of effortful control, and they are anxious to approach novel information (Claes et al., 2009).

Alternatively, it was hypothesised that the association between memory perspective and its impact – whether an observer perspective is beneficial or detrimental – is mediated by one's self-esteem (Libby, Valenti, Pfent, & Eibach, 2011). Indeed, Libby et al. (2011) found that student participants with a low self-esteem spontaneously more often adopted an observer perspective while retrieving memories referring to a failure experience. In addition, doing this enlarged their negative emotions and the experience of shame, which corroborated their current self-esteem. BPD patients are generally considered as having a low self-esteem (e.g., Rüsch et al., 2007).

Future studies are recommended to replicate our findings, and to further disentangle the associations between vantage perspective during recall, emotional intensity, other process variables, and (the progress of) PTSD (in BPD). Future studies should also further investigate the (generalised) occurrence of observer memories in

traumatised/BPD patients. Finally, to check whether BPD patients indeed more often adopt an observer perspective during recall, future studies should include clinical non-BPD and non-clinical control groups besides BPD patients.

RESEARCH AIM 3: BROADENING THE KNOWLEDGE ON THE ROLE OF SELF-DISCREPANCY IN AUTOBIOGRAPHICAL MEMORY RETRIEVAL

The third and final aim of this thesis was to further investigate the association between self-discrepancy and memory specificity, and to explore the association between self-discrepancy and vantage point during recall. More specifically, we hypothesised that the autobiographical memory disturbances of interest (in BPD, but not exclusively) would in part depend on the AMT cues used (Hypothesis 1).

SUMMARY OF FINDINGS

OGM (in BPD, but not exclusively) depends on the AMT cues used (Hypothesis 1)

With respect to OGM, it has recently been suggested that the idiosyncratic meaning a cue has for a respondent may influence memory specificity (Barnhofer, Crane, Spinhoven, & Williams, 2007; Crane, Barnhofer, & Williams, 2007; Spinhoven et al., 2007). According to the Self-Memory System of Conway and colleagues (SMS; Conway & Pleydell-Pearce, 2000; Conway, Singer, & Tagini, 2004), cues that are high discrepant from one's actual self-concept evoke more overgeneral memories following a shift of resources from adaptive correspondence towards self-coherence ('active attention shift', Barnhofer et al., 2007). This closely relates to the functional avoidance (FA) component in the CaR-FA-X model of Williams et al. (2007). Another line of reasoning suggests that low self-discrepant cues may elicit higher levels of OGMs as well. More specifically, it was suggested that in people with highly endorsed dysfunctional schemas, especially cues that closely relate to these schemas would hinder specific

memory retrieval. Possibly, these highly self-relevant cues could reactivate the related schema, resulting in a drain of processing resources away from the memory search process ('passive attention shift', Barnhofer et al., 2007; Dalgleish et al., 2003; Spinhoven et al., 2007). Also, the reactivation of the schema may induce ruminative responses, further processing the events in memory that emphasise discrepancies between the current (dysfunctional) self-concept and one's desired self-concepts (CaR in the CaR-FA-X model of Williams et al., 2007; Crane et al., 2007). Because these events have been rehearsed many times, an easily accessible generic category of events may have been installed, again increasing the likelihood of OGMs (Barnhofer et al., 2007). Thus, whereas the FA account predicts that especially high self-discrepant information (which is, according to the theoretical models, also highly self-relevant) would result in OGMs, the CaR account rather suggests that highly self-relevant (and even low self-discrepant) cues would elicit more OGMs.

We investigated the association between (the impact of) cue discrepancy and memory specificity by (a) determining the standard AMT's level of self-discrepancy for each respondent (Chapter 3); (b) administering a personalised AMT to each respondent besides the standard AMT (Chapter 4); and (c) comparing memory specificity in response to low and high discrepant cues of a 'group-specific' AMT (e.g., Chapter 5 – but the findings we report here, have not been reported in any of the previous chapters). The first two methods were applied in clinical BPD samples, whereas the 'group-specific' AMTs were administered in two convenience samples.

In Chapter 3, we defined an index, expressing the extent to which the standard AMT is self-discrepant (and self-relevant, because these concepts are confounded due to the method used – see also below). A multiple hierarchical regression analysis showed that the interaction between depressed state and the AMT's level of self-discrepancy was the only significant predictor of the proportion of specific memories retrieved in response to the AMT cues. More concretely, supporting the FA account, we found that this index (and not the one solely expressing self-relevancy) was highly and negatively

associated with memory specificity in the depressed BPD patients. A reversed (marginally significant) correlation was found in the non-depressed patients, which rather supports the CaR account.

In our large clinical sample (Chapter 4), we operationalised self-discrepancy by means of personal AMTs (pAMT), using the ten most self-discrepant self-guides formulated by each participant. Unlike what we expected based on the FA account, pAMT administration did not result in lower proportions of specific memories. Moreover, pAMT administration resulted in significantly less categoric memories, and nearly twice as many omissions than standard AMT administration. The latter findings also somehow contradict the CaR account, since all cues are highly self-relevant. Holmes (personal communication, 19/10/2011) suggested that highly personally tailored (p)AMTs could trigger flashback-type involuntary memories, paradoxically resulting in higher levels of specific memories.

In the Reza study (2011, convenience sample, n = 148, with 38 participants with a history of depression), we administered an AMT with cues that were rated as high (e.g., *enjoying, optimistic, active*) and low discrepant (e.g., *honest, intelligent, neat*) for depression by clinicians (for details, see Schoofs, Hermans, & Raes, 2012). In line with our previous results (Chapter 3) and the findings of Crane et al. (2007) in remitted depressed patients, we hypothesised that the participants with a history of depression would recall less specific and more categoric memories in response to the cues that were rated as high discrepant for depression. However, no differences were found between the numbers of specific (categoric) memories evoked by high or low discrepant cues. Finally, in the Koolen study (2012, convenience sample, n = 120) the AMT we administered consisted of cues that were high (e.g., *self-assured, successful, relaxed*) and low discrepant (e.g., *tired, stressed, creative*) for BPD patients, rated by clinicians (for details, see Koolen, 2012). In line with the CaR account, our findings

suggest that especially low discrepant cues are associated with reduced memory specificity, irrespective of the number of BPD complaints[34] reported. Yet, given that only few BPD complaints were reported in this sample (ranging from 0 to 29, while the theoretical maximum score of the BSI is 52), it could be questioned to what extent the low (BPD-) discrepant cues are really low discrepant for these non-clinical respondents. These findings would then be supportive for the FA account.

Taken together, our attempts to investigate the association between self-discrepancy and memory specificity resulted in different findings, perhaps due to the method used to cover the concept of self-discrepancy. In Chapter 4, we already questioned the validity of the pAMT. The pAMT cues are probably highly personally self-relevant and self-discrepant, given that they were all literally formulated and scored on self-discrepancy by the respondents. However, in contrast to the standard AMT, pAMT cues are not matched on other important variables that have been shown to have an impact on memory specificity (e.g., imageability, Williams, Healy, & Ellis, 1999; or familiarity). This may contribute to the relatively large proportion of omissions found with the pAMT. Alternatively, given that the pAMT was the final test included in the test battery, omissions may also have resulted from exhaustion. However, and more problematic, (part of the) omissions may also represent non-verbalised OGMs following the explicit instruction to retrieve specific memories. In the latter case, the pAMT is invalid for examining the association between self-discrepancy and memory specificity. In addition, in BPD patients, who are known to commonly suffer from an unstable sense of self, a pAMT constructed with self-guides of the Self-Description Questionnaire (SDQ; see Chapter 4 for a broader description of this instrument) that was administered three weeks before may not represent one's current discrepant selves anymore. The 'group-

[34] BPD complaints were measured with the Borderline Syndrome Index (BSI; Vertommen & Van de Wygaert, 1988). See Chapter 5, p. 119, for a broader description of this instrument.

specific' AMTs used in the convenience samples then, are properly constructed, matching all cues for imageability, familiarity and valence (see Schoofs et al., 2012, and Koolen, 2012, respectively). However, they may fail to sufficiently address the respondent's actual personally self-relevant or self-discrepant topics. Therefore, of all methods we developed to cover this topic of study, we believe the index method used in Chapter 3 is the most reliable. The AMT cues are properly selected, and the index expresses to what extent the cues are self-discrepant, thereby addressing the problems mentioned of the pAMT and the 'group-specific' AMT.

Furthermore, in retrospect, we think all measures we used to operationalise self-discrepancy/self-relevance confound both concepts, making it difficult to properly investigate the CaR account. Indeed, when respondents are asked to write down (discrepant) self-guides in the SDQ, it is very likely that they will mainly come up with highly self-relevant self-guides. Cues that are highly self-relevant but low self-discrepant will only seldom be derived with this method. One possible, though labour-intensive way, to compare the importance of self-discrepancy and self-relevance is to administer regular AMTs. In the next step, self-relevance and discrepancy are inventoried separately for each cue. In a non-clinical adolescent sample, Schoofs et al. (2012) administered a (minimal instructions, i.e., without the explicit instruction to retrieve specific memories) AMT consisting of both high and low discrepant cues. Afterwards, they inventoried the personal importance (relevance) of the cues. They found that the effect of self-discrepancy remained, even when they controlled for the personal importance of the cues. However, for now, findings are supportive for the CaR (in remitted depressed patients: Barnhofer et al., 2007; Spinhoven et al., 2007, study 1; in BPD patients: Spinhoven et al., 2007, study 2), as well as for the FA account (in non-clinical adolescents: Schoofs et al., 2012; in remitted depressed patients: Crane et al., 2007; in depressed BPD patients: Van den Broeck et al., 2012 – Chapter 3). Indeed, taking into account all the above associations, we believe we have found partial

support for the FA hypothesis in currently depressed BPD patients. Future studies may relate this association to avoidance measures, which were not included in this study.

Vantage perspective (in BPD, but not exclusively) depends on the AMT cues used (Hypothesis 1 - exploratory)

With respect to vantage perspective during recall, we explored, in analogy with OGM, whether higher levels of self-discrepancy were associated with higher proportions of observer memories, which are known to be less emotional. We found that BPD patients reported equal proportions of observer memories in response to both the standard AMT and the personalised AMT (Chapter 4). Likewise, using a 'group-specific' AMT for depression (Reza, 2011), we found that high and low discrepant cues did not evoke different proportions of observer memories in participants with a history of depression, nor in the never depressed participants. In the study of Koolen (2012), we administered a 'group-specific' AMT for BPD. We found that high discrepant cues and low discrepant cues did not evoke different levels of observer memories in those participants who reported the most complaints. In the group low on BPD complaints, however, the low (BPD) discrepant cues resulted in higher proportions of observer memories than the high (BPD) discrepant cues. These findings are contrary to what could be expected if the adoption of an observer perspective would serve functional avoidance (%O-HD > %O-LD). Assuming that participants who report more BPD complaints have more widely endorsed BPD schemas, these findings also contradict what could be expected according to the CaR account (high BPD group > low BPD group). On the other hand, of course, cues that are low discrepant for BPD patients (e.g., *tired, dissatisfied*) may be high discrepant for respondents reporting only few BPD complaints. Perhaps these cues may induce comparison-based processing, which is found to be associated with more observer memories (e.g., Libby & Eibach, 2002).

THEORETICAL CONSIDERATIONS

To conclude then, taken into account our considerations about the validity of the methods used to cover self-discrepancy, findings suggest that self-discrepancy, in interaction with depressed state, adds to OGM, in BPD as well as in non-BPD participants. Findings, however, are limited in number, and future methodological improvements may help to further disentangle the potentially differential impact of self-discrepancy and self-relevance.

Given our considerations formulated above on the impact of emotional dysregulation on autobiographical memory retrieval, one way to understand these findings would be to assume that sometimes, BPD patients may experience certain affective states, e.g., depression, in which the intensity of their emotions is reduced to more normal levels, or in which resources are further depleted, so that the intensity build-up is slowed down. In these circumstances, BPD patients may succeed to apply cognitive avoidance strategies, helping them to blunt unpleasant self-discrepant information. Likewise, given our considerations on identity disturbance, it could be argued that reduced resources due to depression in BPD patients may hinder the shifting between different self-concepts. Specific self-discrepant information should then be retrieved out of structures that are less accessible because they are linked to other self-concepts. Therefore, generic memories may be more likely in response to self-discrepant cues.

With respect to the impact of self-discrepancy on vantage perspective during recall, findings are still inconclusive. As far as we know, we are the first to study the association between these concepts. Unfortunately, in retrospect, we believe we did not use the best method available to study this association. Also, in our non-clinical samples, results were inconsistent. Future studies should clarify this association, in different samples, and using sound methods.

SUMMARY OF FINDINGS AND THEORETICAL CONSIDERATIONS

Taken all findings together, we hypothesise that the CaR-FA-X model is not applicable to BPD patients. Yet, perhaps limited executive functioning adds to the explanation of the pattern of results with regard to OGM in BPD. In addition, we suggested that differences between depressed/traumatised and BPD patients with respect to OGM may relate to differences in affect-regulation in these samples. We further speculated that, in order for the CaR-FA-X model to negatively influence memory specificity, the presence of a rather stable, well-defined, and elaborated self-concept is necessary. This is not the case in BPD patients.

Furthermore, with respect to vantage perspective during autobiographical memory retrieval, we hypothesised that BPD patients, stimulated by the distress caused by one's affective instability, are motivated to develop a unified self-concept. However, they may lack the abilities to go beyond the first step of comparison (by means of an observer perspective) to the second step of successfully processing the similarities and differences (by means of a field perspective), and integrate them into their self-concept. BPD patients with PTSD retrieve more observer memories. Given the inverse association with avoidance, we argued that observer memories in traumatised BPD patients might dampen the intensity of one's emotions.

Finally, regarding self-discrepancy, we found that depressed state interacted with self-discrepancy to predict memory specificity. This may suggest that information processing in depressed BPD patients differs from that in BPD patients without MDD.

CLINICAL IMPLICATIONS

Given that reduced memory specificity predicts future depressive and post-traumatic symptom severity in BPD patients, we believe BPD patients, as depressed and traumatised patients, could potentially benefit from interventions that increase memory specificity, e.g., Memory Specificity Training (MeST; Moradi et al., 2014; Raes,

Williams, & Hermans, 2009), or Mindfulness-Based Cognitive Therapy (MBCT; Williams, Teasdale, Segal, & Soulsby, 2000). Elements of MBCT are included in Dialectical Behavioural Therapy (DBT; Linehan, 1993), a therapeutic strategy that has shown to be effective in treating BPD (Trimbosinstituut, 2008).

Furthermore, with respect to the treatment of PTSD, a core element of exposure is reliving the trauma, typically instructing patients to recall their trauma from a field perspective (Foa & Meadows, 1997). Although according to our findings the proportion of observer memories in BPD patients is not predictive of future symptom severity or traumatic state, levels of observer memories in BPD patients with PTSD are elevated compared to BPD patients without PTSD. Whereas some have argued that this hinders adequate processing of the traumatic experiences (e.g., Kenny et al., 2009), others suggested that an observer perspective in clinical groups prevents one to loose contact with emotional experiences (e.g., Kross & Ayduk, 2009). Linehan (1993) possibly combines both accounts, stating that the treatment of trauma in BPD patients should not be the first focus of treatment. BPD patients should first acquire behavioural (e.g., NSSI, suicidality), interpersonal (at least there should be a good relationship with the therapist), and societal stability (e.g., work, place to live). Likewise, schema-focused therapists do not directly introduce imagery rescripting exercises with respect to traumatic experiences in BPD patients. During the first stage of therapy, the therapist should primarily invest in bonding with the patient, and therapist and patients should agree on how to deal with feelings that generally induce self-destructive behaviours (Kellogg & Young, 2006).

This would match the therapeutic inferences we would like to suggest based on the theoretical considerations outlined above. Indeed, against the background of the importance of one's self-structure, we think treatment for BPD should primarily aim to strengthen the patients' self-concept, and their abilities to integrate contradictory information. This way, BPD patients' self-structure may reach levels at which they can use (reduced) memory specificity (and perhaps also vantage perspective during recall)

flexibly, as adaptive strategies (see, e.g., Debeer, Raes, Williams, & Hermans, 2012, cited in Chapter 2, p. 45). As DBT, Mentalisation Based Therapy (MBT), and Schema-Focused Therapy (SFT) have been shown to be effective in treating BPD (Trimbosinstituut, 2008). We believe these therapeutic frameworks all stimulate integration and self-growth, albeit in different ways. In MBT, social understanding is explicitly strengthened. DBT has an interpersonal skills training, elements of mindfulness, and social metaphors, besides skill trainings aimed at dealing with emotional dysregulation. Finally, SFT encourages the discussion between different parts of oneself, and uses limited reparenting to re-model the early relationships with important others. In addition, all frameworks have a consistent theory on the origin and development of BPD patients' identity and behaviour. Such a model may contribute to the development of self-acceptance and self-confidence in BPD patients (Katsakou et al., 2012), which in turn is necessary to further develop one's self-concept (e.g., Rice & Dellwo, 2002).

DIRECTIONS FOR FUTURE RESEARCH

In the sections above, we already directly and indirectly suggested some ideas for future research. For instance, from a methodological point of view, we suggested how future studies could more validly address the question about the role of self-discrepancy and/or self-relevancy. More specifically, we proposed that future studies could administer a standard AMT, after which respondents are asked to rate for each cue (a) how personally relevant it is; and (b) to what extent it currently deviates from one's actual self-concept. This method would overcome the confounded scores mixing both self-relevance and self-discrepancy that we (Chapter 3) and Crane et al. (2007) used previously. In addition, especially with respect to BPD patients, this method would control for the potential impact of unstable self-concepts.

On the content level, we argued that BPD patients' performances on the AMT (for both memory specificity and vantage perspective during recall) might depend on the current affective state they are in, and that depression in BPD patients not necessarily corresponds to depression in MDD. Future studies, thus, may investigate the nature of depression in BPD patients, and how it distinguishes from depression in MDD. In addition, we think it could be useful to include a measure that maps a respondent's affective state prior to (and perhaps also after) AMT administration (or perhaps even before and after each cue) to investigate the impact of one's affective state on autobiographical memory performance.

Also, given that we are the first to study vantage perspective in BPD patients, future studies are recommended to further investigate vantage perspective in BPD patients. For instance, to see whether BPD patients indeed retrieve higher proportions of observer memories than non-BPD participants, we suggest to set up a study comparing the proportion of observer memories in different groups (normal controls, traumatised patients, BPD patients). Furthermore, it would be interesting to replicate our findings regarding the observer memory retrieval style we observed in traumatised BPD patients. As far as we know, only Kuyken and Howell (2006) studied the vantage perspective adopted while retrieving non-traumatic memories using the AMT as well. They did not found an observer memory retrieval style in their traumatised (depressed) adolescent participants. Future studies should disentangle whether these different findings are due to diagnosis, age or developmental stage of the participants, or other factors. Additionally, upcoming studies may try to replicate the (negative) association we found between the proportion of observer memories and IES-Avoidance in our BPD patients with PTSD.

Other suggestions for future research closely relate to the theoretical considerations we formulated. First, we think it is important that future studies further study the association between executive functioning and OGM in BPD patients. Correlational studies should include measures of both visual and verbal working memory. In addition,

experimental studies could be set up, in which half of the participants is involved in tasks that use working memory, and the other half is not. If reduced executive functioning affects OGM, the participants who had a complementary working memory task should demonstrate more OGM.

Furthermore, given the theoretical considerations we formulated above regarding the role of emotional dysregulation on memory specificity, future studies may attempt to replicate the findings of Selby, Anestis, Bender, and Joiner (2009), who found that (a) rumination in BPD patients resulted in greater reactivity and intensity of negative affect, and (b) that rumination partially mediated the relation between BPD symptoms and behavioural dysregulation. Extending these findings to memory specificity, it could then be tested whether or not the emotional intensity evoked by rumination in BPD patients correlates with memory specificity.

We finally suggested that the deviant self-structure of BPD patients directly impacts on the autobiographical memory characteristics of interest. A first challenge in testing these hypothesis lies in operationalising the quality of one's self-structure. A creditable attempt was made by Linville (1985), using the term self-complexity. Self-complexity was defined as "a joint function of the number of aspects [of one's self, e.g., one's roles or personality traits] and their degree of independence" (Linville, 1985, p. 99). Linville (1985) provided her participants with a pile of cards with traits. She asked them to categorise them in groups, putting those traits together they felt belonged together. More groups represented higher levels of self-complexity, and higher self-complexity was found to be associated with less extreme affective variability. Indeed, BPD patients are found to have lower grades of self-complexity (Gardner, 1997). Especially the lack of interrelatedness of one's roles ('self-concept differentiation') was associated with BPD related symptoms (e.g., low self-esteem, dissociation) and worse parental bonding. (Lutz & Ross, 2003). We hypothesised that the CaR-FA-X model was only applicable in those with relatively high levels of self-complexity, c.q. self-concept differentiation. To test this hypothesis, one could examine these concepts in depressed, traumatised and

BPD patients, and see how they relate to OGM and/or vantage perspective during recall. More specifically, we would predict that low self-concept differentiation would result in less OGM and more observer memories. From a therapeutic point of view, we could argue that, if these hypotheses were corroborated in future studies, BPD patients would benefit from trainings helping them to integrate, c.q. differentiate complex data.

Another aspect of our line of reasoning on the impact of identity disturbance on autobiographical memory specificity concerned switching between different self-concepts. Zeigler-Hill and Abraham (2006) used experience sampling to investigate the association between the stability of one's self-esteem and borderline features. They found that those who reported more borderline features displayed an unstable low self-esteem. Similar methods could be used to examine how often important self-definitions are active, and whether instability on this behalf is associated with memory specificity and self-discrepancy.

Finally, in general, we would like to stress the importance of studying large samples, given the complexity and heterogeneity of the BPD diagnosis. And, as suggested in Chapter 2, future studies may benefit from including clinical and non-clinical control groups to unravel differences in autobiographical memory functioning.

FINAL REMARKS

The importance of autobiographical memory for daily functioning justifies the study of its characteristics in both healthy and clinical participants. In this thesis, we essentially studied the presence and associations of the specificity and vantage perspective of autobiographical memories, two characteristics of voluntary memory retrieval, in BPD patients. We are aware that our work only highlights some small pieces of the puzzle of autobiographical memory. Indeed, previous studies have shown that autobiographical memory retrieval cannot be considered separately from encoding (e.g., Raes et al., 2009) or processing (e.g., Ehlers & Clark, 2000), the centrality (e.g., Berntsen & Rubin,

2006) and valence (e.g., traumatic vs non-traumatic; e.g., Porter & Birt, 2001) of the retrieved event for one's personal life, and other memory characteristics, such as imagery aspects (e.g., Holmes & Mathews, 2010), the vividness of the memory (d'Argembeau & Van der Linden, 2006), or the extent to which the memory is experienced as intrusive (e.g., Bywaters, Andrade, & Turpin, 2004). Also, besides voluntary memory retrieval, some memories are experienced as involuntarily popping into our mind (e.g., Krans, 2013). It is only recently that researchers have begun to study these aspects of memory in relation to each other and the frameworks of autobiographical memory organisation (e.g., Watson, Berntsen, Kuyken, & Watkins, 2013).

Nevertheless, with respect to our research topics, we hope we have made a modest contribution by this thesis. In short, although the current studies are still inconclusive about the association between OGM and BPD, they suggest that OGM in BPD is not associated with a co-morbid diagnosis of neither MDD nor PTSD. Yet, given that OGM is predictive for future depressive and post-traumatic symptom severity, we think that OGM may have some clinical relevance in BPD patients as well. Also, OGM has been found to be associated with NSSI diversity. Furthermore, with respect to vantage perspective, we found that PTSD is associated with higher proportions of observer memories. Finally, our findings suggest that self-discrepancy adds to memory specificity in depressed BPD patients. We have argued that these findings could be interpreted against the background of reduced executive functioning, emotional dysregulation and/or identity disturbance, and we proposed directions for future studies to further investigate our ideas.

BPD is a heterogeneous, though common diagnosis, and all sufferers (and their surroundings) report high clinical burden. Patients and society would therefore benefit from a clear understanding of information processes in these patients, being both a target for therapy as well as the medium by which therapy works. We hope this work,

despite its shortcomings, may contribute to a better understanding of this disorder and, eventually, to its treatment.

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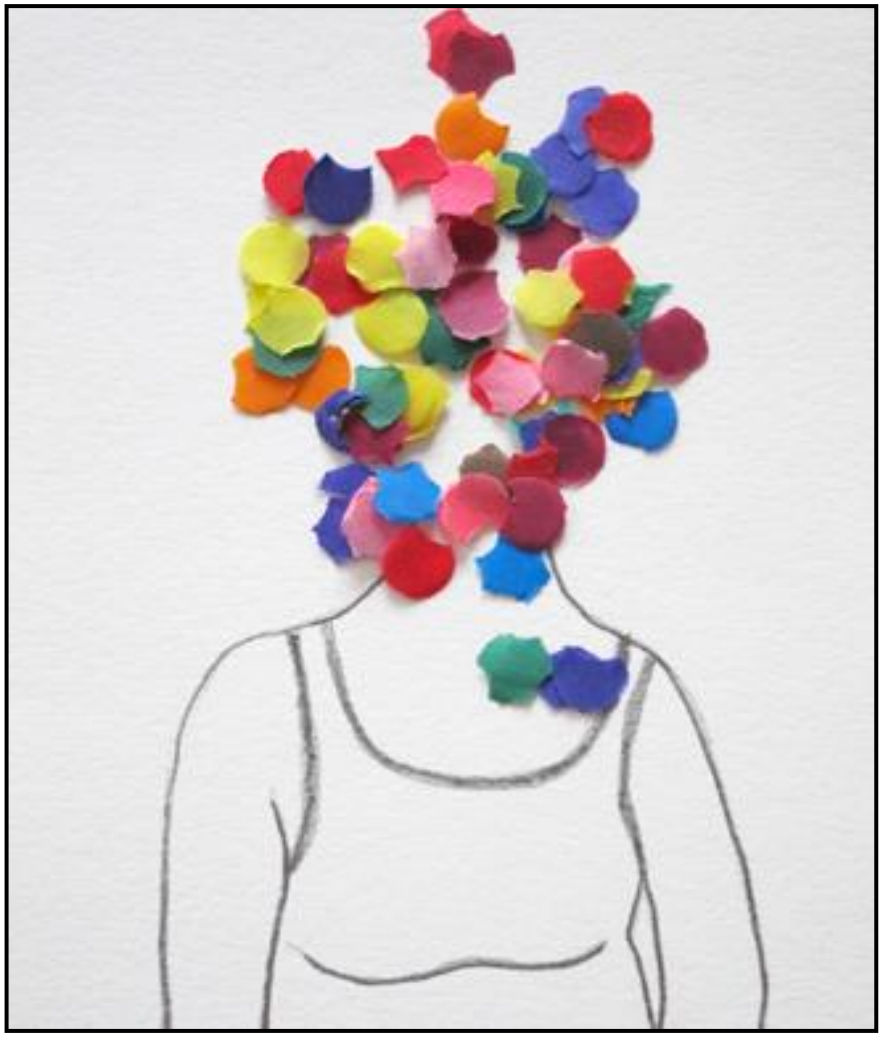

Appendices

APPENDIX A. DEFINITIONS OF OUGHT, IDEAL, AND FEARED SELVES

(From Crane, Barnhofer, & Williams, 2007, p. 323)

The ***''OUGHT SELF''*** was described as ''the kind of person you believe you have a duty or obligation to be, or that you believe people think you should be. It's defined by the personality characteristics you think you ought to possess, or feel obligated to possess. It's not necessary that you have these characteristics now, only that you believe you ought to have them.''

The ***''IDEAL SELF''*** was described as ''the kind of person you'd really like to be. It's defined by the personality characteristics you would ideally like to have. It's not necessary that you have these characteristics now, only that you believe you want to have them.''

The ***''FEARED SELF''*** was described as ''the kind of person that you fear being, worry about being, or dislike being. It's defined by the personality characteristics that you think you might have now or in the future, but that you would rather not have. It's not necessary that you have these characteristics now, only that you do not want to have them, or want to avoid having them.

APPENDIX B. DESCRIPTIONS OF ADDITIONAL INSTRUMENTS

ACCEPTANCE AND ACTION QUESTIONNAIRE-II (AAQ-II; BOND ET AL., 2011; DUTCH TRANSLATION BY THE ACTINTERVISIE GROEP, 2006).

The AAQ-II is a self-report measure of psychological inflexibility, acceptance, or experiential avoidance. It counts 10 Items that question the extent to which respondents try to escape from negative internal or private sensations, emotions, or cognitions. Participants should indicate how often they feel what is expressed in the items on a 7-point scale, ranging from 1 (*never true*) to 7 (*always true*), e.g. "My painful memories prevent me from having a fulfilling life". Total scores thus vary from 10 to 70, with higher scores reflecting more experiential avoidance, while lower scores indicate acceptance and commitment for action. High internal consistency is reported, alpha = .84 (Bond et al., 2011), as well as excellent retest-reliability. Concurrent, predictive, and discriminant validity are very good too.

DISSOCIATION QUESTIONNAIRE (DIS-Q; VANDERLINDEN, VAN DYCK, VERTOMMEN, VANDEREYCKEN, & VERKES, 1993)

This 63 item self-report questionnaire measures dissociation. It was constructed using items from the Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986), the Perceptual Alteration Scale (PAS; Sanders, 1986), and the Questionnaire of Experiences of Dissociation (QES; Riley, 1988), and some new items. Items should be scored on a 5-point Likert scale, indicating to what extent that statement is applicable to the respondent, ranging from *not at all applicable* to *extremely applicable*. Four subscales were defined (Vanderlinden et al., 1993, p. 23): (1) Identity confusion (25 items, 'one is aware of influences of dissociated alter personalities'; (2) Loss of control over behaviour, thoughts, and emotions (18 items, 'experiences of losing control over behaviour, thoughts and feelings, and in that sense this subscale refers also to impulsiveness'); (3) Amnesia (14 items); and (4) Absorption (6 items, 'enhanced concentration'). Good internal consistency and test-retest reliability were reported, together with good construct and congruent validity (Vanderlinden et al., 1993).

Wechsler Adult Intelligence Scale, 3rd Ed., Letter-Number-Sequencing task (WAIS-CLN; Wechsler, 2000).

The WAIS is an often used intelligence measure, consisting of 14 subtests. We only used one of them, the Letter-Number-Sequencing task. In this task, participants are presented with a growing sequence of letters and numbers. They are instructed to repeat all digits, but in another order. They should first list up all the numbers in ascending order, followed by the letters in alphabetical order. Five practice items are presented before actual testing begins. Then, three items consisting of two digits are presented. Furthermore, three items consisting of three items, and so on. The test stops when a respondent fails to repeat three items of the same length. This subtest was originally developed by Gold, Carpenter, Randolph, Goldberg, and Weinberger (1997), and it is part of the Working Memory Index that can be computed after administration of the full WAIS (Wechsler, 2000). We therefore used it as a compact estimation of working memory.

White Bear Suppression Inventory (WBSI, Wegner & Zanakos, 1994; Dutch translation by Muris, Merckelbach, & Horselenberg, 1996)

The White Bear Suppression Inventory (WBSI; Wegner & Zanakos, 1994) counts 15 items assessing the tendency to suppress unwanted thoughts, e.g. “I always put problems out of my mind”, or “I have often thoughts I try to avoid”. Respondents are asked to rate each item on a 5-point Likert scale, ranging from *strongly disagree* to *strongly agree*. Total score thus ranges from 15 to 75, with higher scores indicating a stronger tendency to suppress unwanted thoughts. The Dutch translation we used has good internal consistency, alpha ranges from .86 to .89, and satisfactory test-retest reliability, r = .80 after 12 weeks (Muris, Merckelbach, & Horselenberg, 1996; Rassin, Muris, Schmidt, & Merckelbach, 2000). Some have found a one-factor solution ('thought suppression'; e.g., Muris et al., 1996; Rafnsson & Smari, 2001; Wegner & Zanakos, 1994), while others have found a second factor, which they called ‘failure of suppression’, or ‘intrusions’ (Höping & de Jong-Meyer, 2003; Rassin, 2003).

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